COMPAQ

ProLiant ML370 Generation 2 Server

Maintenance and Service Guide

First Edition (May 2001)
Part Number 203511-001
Spare Part Number 230989-001
Compaq Computer Corporation

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About This Guide

This maintenance and service guide is a document that can be used for reference when servicing the Compaq *ProLiant*™ ML370 Generation 2 server.

WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Compaq Technician Notes

WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void any warranty.

WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, do not exceed the level of repair specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs could create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: To properly ventilate your system, you must provide at least 30.5 cm (12 inches) of clearance at the front and back of the server.

CAUTION: The server is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- www.compaq.com/support/servers
- *Compaq Service Quick Reference Guide*
- Service training guides
- Compaq service advisories and bulletins
- Compaq *QuickFind™*
- Compaq Insight Manager XE
- Compaq download facility: Call 1-281-518-1418

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For Compaq technical support:

- In the United States and Canada, call 1-800-386-2172.
- Outside the United States and Canada, visit the Compaq website:

  www.compaq.com

Chapter 1

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for Compaq *ProLiant*™ ML370 Generation 2 servers. See Table 1-1 for the names of referenced spare parts.

Mechanical Components

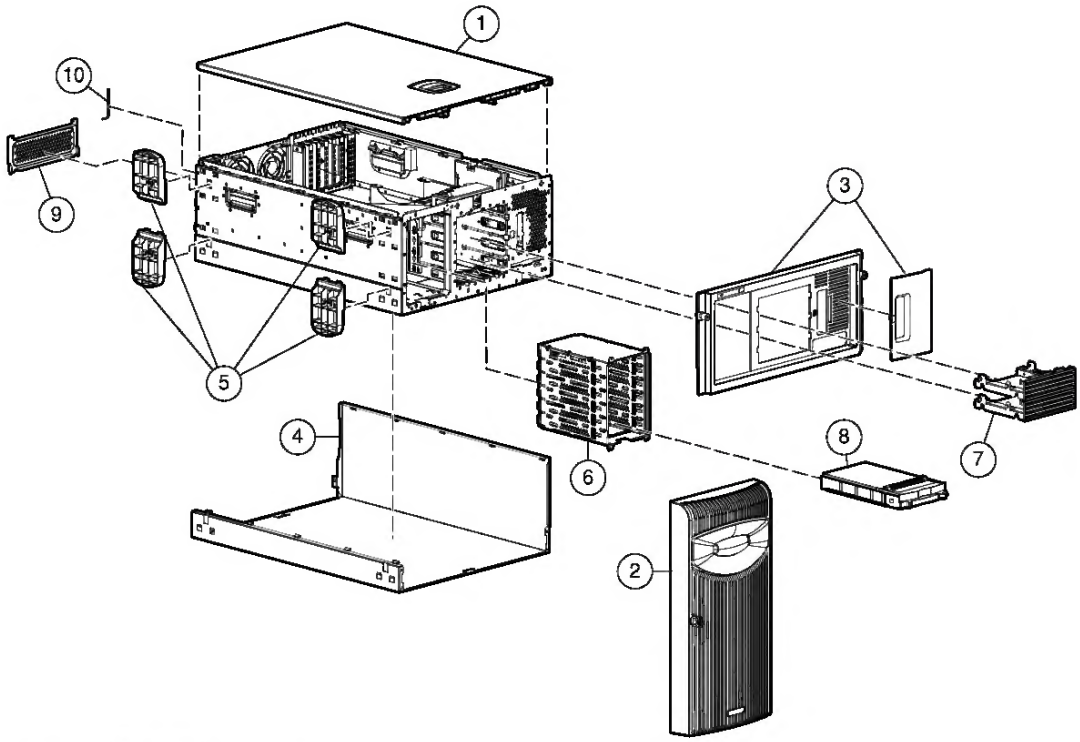

Figure 1-1. Mechanical components

System Components

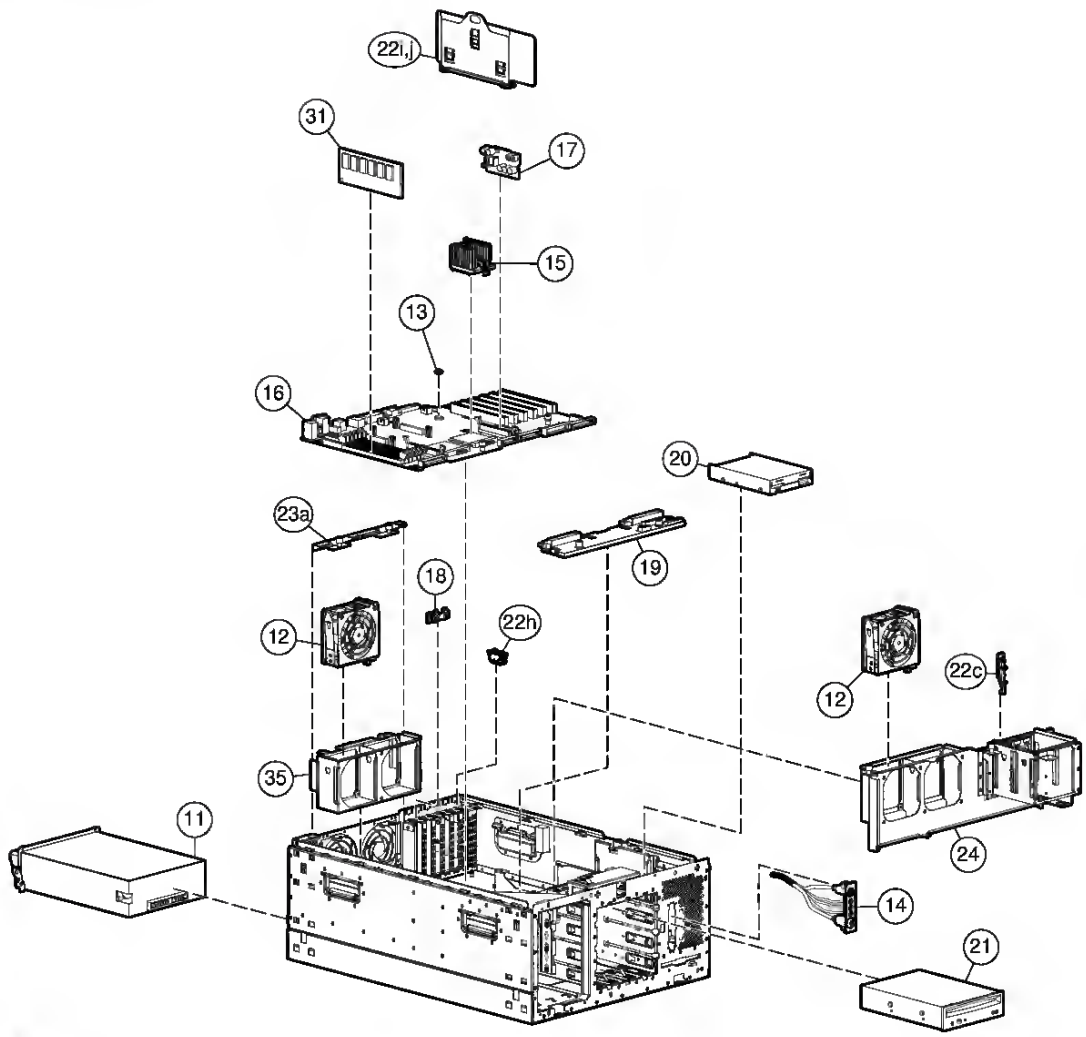

Figure 1-2. System components

Mechanical and System Spare Parts List

Table 1-1
Mechanical and System Spare Parts List

Item	Description	Assembly Number	Spare Part Number
	Mechanical Components		
1	Access panel (top cover)	224969-001	230985-001
2	Front bezel (tower model only)	224991-001	230996-001
3	Rack bezel (rack model only)	224992-001	230997-001
4	Tower hood cover	224954-001	233410-001
5	Feet (tower model only) (part of kit #23)	228148-001	230979-001
6	6 x 1-inch hot-plug SCSI drive cage, with backplane	224990-001	230995-001
7	Removable media blanks	141289-002	231212-001
8	Hard drive blank	349448-001	122759-001
9	Power supply blank	224955-001	233601-001
10	Torx T-15 tool	107473-001	199630-001
	System Components		
11	Power supply, 500 W, with handle	216068-001	230993-001
12	Fans, 92 mm	224994-001	231213-001
13	3.3 V lithium battery	334149-001	179322-001
14	Power button/LED assembly	225034-001	230986-001
	Boards		
15	Processor, Intel Pentium III, 1.13-GHz, with heatsink	235384-003	239324-001
16	System board	011074-001	230998-001
17	Processor power module (PPM)	217366-001	228506-001
18	PCI Hot Plug backplane	011077-001	230981-001
19	Power supply backplane	011080-001	230982-001
	Mass Storage Devices		
20	Diskette drive, 3-mode, 1.44-MB	233327-001	233409-001
21	CD-ROM drive, IDE, 40x	222839-001	233408-001

NOTE: * Not shown

continued

Table 1-1
Mechanical and System Spare Parts List *continued*

Item	Description	Assembly Number	Spare Part Number
	Miscellaneous		
22	Plastics kit		230979-001
	a) Foot, stone (see item number 6)	228148-001	
	b) Receptacle, door snap, opal *	148525-003	
	c) Retainer, card guide, PCI		
	Hot-plug	1774555-003	
	Non-hot-plug	1774555-004	
	d) Fastener, 0.150 plastic standoff *	225249-001	
	e) Fastener, 0.202 plastic standoff *	225250-001	
	f) Clip, cable, adhesive, 1.77 inch *	241347-007	
	g) Clip, retainer, 0 125 diameter *	115151-007	
	h) Assembly, PCI latch and base		
	Hot-plug	228194-001	
	Non-hot-plug	228194-002	
	PCI Hot Plug Divider Assembly		
	i) Puller, PCI Hot Plug	230674-001	
	j) Divider, PCI Hot Plug	226693-001	
	k) Base, PCI Hot Plug *	226692-001	
23	Hardware kit		230980-001
	a) Bracket, rear, removable	224965-001	
	b) Bracket, floppy tray*	224953-001	
	c) Bracket, floppy retainer*	228189-001	
	d) Cover, slot, PCI expansion*	306348-001	
	e) Bracket, blank, option board, new PCI latch*	228072-001	
24	Wall, center	224949-001	230999-001
25	Rack-mounting kit *	228715-001	230994-001
26	Country kit *	195316-001	230992-001
27	Maintenance and service guide *	203511-001	230989-001
28	Return kit, packing box and cushions *		230990-001

NOTE: * Not shown

continued

Table 1-1
Mechanical and System Spare Parts List *continued*

Item	Description	Assembly Number	Spare Part Number
	Cables		
29	Miscellaneous data cable kit *		230988-001
	a) IDE hard drive/CD-ROM drive data cable	242947-019	
	b) Floppy drive cable	271946-005	
	c) PCI Hot Plug backplane cable	224999-001	
	d) Point-to-point SCSI cable	166298-033	
	e) 3-device SCSI cable	148785-004	
	f) Auxiliary VHDCI SCSI cable	155074-002	
30	Miscellaneous power cable kit *		230987-001
	a) Diskette and CD-ROM drive power cable	224997-001	
	b) Power supply cable, 24-pin	224996-001	
	c) Fan cage cable	224998-001	
	Memory		
31	256-MB (2 x 128-MB), 133-MHz, registered SDRAM DIMM kit	201692-B21	164278-001
32	512-MB (2 x 256-MB), 133-MHz, registered SDRAM DIMM kit *	201693-B21	157377-001
33	1-GB (2 x 512-MB), 133-MHz, registered SDRAM DIMM kit *	201694-B21	177628-001
34	2-GB (2 x 1-GB), 133-MHz, registered SDRAM DIMM kit *	201695-B21	163902-001
	Options		
35	Rear fan cage	224956-001	230984-001
36	Tower-to-rack conversion kit *	225074-B21	230997-001
37	Smart Array 5i Controller *	226593-B21	233609-001
38	Telco rack-mounting kit *	231121-B21	236856-001
39	Third-party rack-mounting kit *	231122-B21	236857-001

NOTE: * Not shown

Chapter 2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for Compaq ProLiant ML370 Generation 2 servers. After completing all necessary removal and replacement procedures, run the Diagnostics program to verify that all components operate properly.

You need the following items for some procedures:

- Torx T-15 tool (ships standard with your server)
- Diagnostics Utility from the Compaq *SmartStart*™ for Servers CD

Safety Considerations

Before performing service procedures, review the following safety information.

Electrostatic Discharge

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives PCB assembly-side down.

Symbols on Equipment

up to 34 kg

up to 75 lb

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or a hot component.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching it.

Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. The enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This label or equivalent is located on the surface of your CD-RDM drive. This label indicates that the product is classified as a Class 1 Laser Product.

Rack Warnings and Cautions

WARNING: To reduce the risk of personal injury or damage to the equipment, adequately stabilize the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.

WARNING: To reduce the risk of personal injury or equipment damage, ensure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizers are attached to the rack for single-rack installation.
- The racks are installed together in multiple-rack installations.

WARNING: When installing the server in a Telco rack, adequately secure the rack frame to the building structure at the top and bottom.

WARNING: To reduce the risk of personal injury or damage to the equipment, use two or more people to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when moved on its casters. Handle the rack from both sides as it rolls down the ramp from the pallet. Do not stand in front of the rack.

CAUTION: Always begin by mounting the heaviest item on the bottom of the rack. Continue to populate the rack from the bottom to the top.

Server Warnings and Cautions

WARNING: To reduce the risk of personal injury from hot surfaces, allow the hot-plug drives and the internal system components to cool before touching.

WARNING: To reduce the risk of electrical shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from each power supply to disconnect power to the equipment.

WARNING: Because the rack allows you to stack server components in a vertical rather than a horizontal plane, you must take precautions to provide for rack stability and safety to protect both personnel and property. Heed all cautions and warnings throughout the installation instructions that came with the server.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

CAUTION: Do not operate the server for extended periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

Preparation Procedures

To access some components and perform certain service procedures, you must do one or more of the following:

- Extend the server from the rack.

  If you are performing service procedures in a Compaq rack or third-party rack cabinet, you can use the locking feature of the rack rails to support the server and gain access to internal components.

- Power down the server.

  If you must remove a server from a rack or a non-hot-plug component from a server, power down the server.

- Remove the server from the rack.

  If the rack environment, cabling configuration, or the server location in the rack creates awkward conditions, remove the server from the rack. If your server is installed in a Telco rack, you must remove the server from the rack to access internal components.

Extending the Server from the Rack

To extend tbe server from the rack:

1. Loosen the thumbscrews tbat secure the front bezel to the front of the rack ❶.
2. Extend the server on the rack rails until the spring-load rail lock engages ❷.

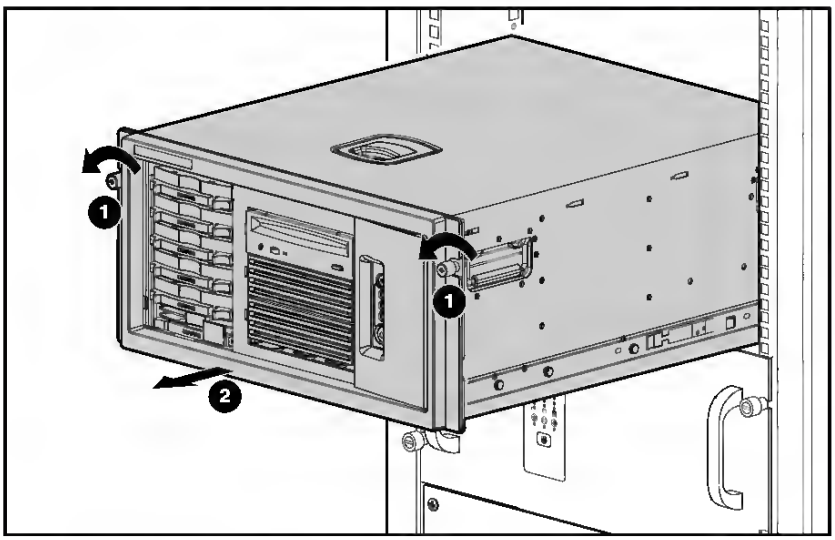

Figure 2-1. Extending the server from the rack

WARNING: To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the component into or out of the rack. The sliding rails could pinch your fingertips.

After performing the installation or maintenance procedure:

1. Press the tabs on the ends of both server rails and slide the server back into the rack.
2. Tighten the thumbscrews to secure the server in the rack.

Powering Down the Server

System power in ProLiant ML370 Generation 2 servers does not completely sbut off with tbe front panel Power On/Standby button. The button toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the server.

WARNING: To reduce the risk of injury from electrical shock, remove the power cords to completely disconnect power from the system.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, see the "Electrostatic Discharge Information" section in this chapter.

Rack Server

To power down the rack server:

1. Back up your server data.
2. Shut down the operating system as directed in your operating system instructions.
3. Press the Power On/Standby button.

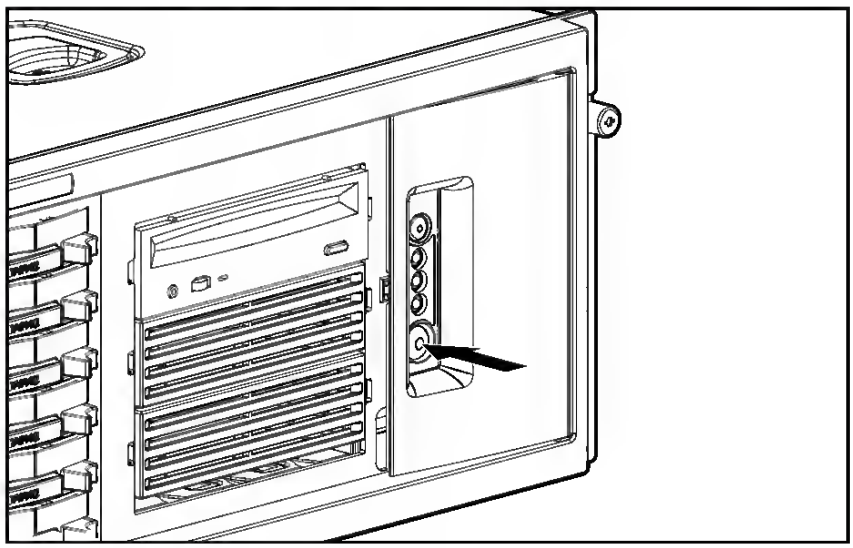

Figure 2-2. Pressing the Power On/Standby button

4. Verify that the system power LED on the front panel, near the Power On/Standby button, is amber and that the fan noise stops.

Tower Server

To power down the tower server:

1. Back up your server data.
2. Shut down the operating system as directed in your operating system instructions.
3. Open the front bezel.

4. Press the Power On/Standby button. The system power LED turns amber when the server is powered off in this manner.

WARNING: Setting the server Power On/Standby button to the off position removes power from most areas of the server, this process may take 30 seconds. Portions of the power supply and some internal circuitry remain active until the AC power cord is disconnected.

If the server has multiple power supplies installed, it is necessary to remove all power cords to remove all power from the system.

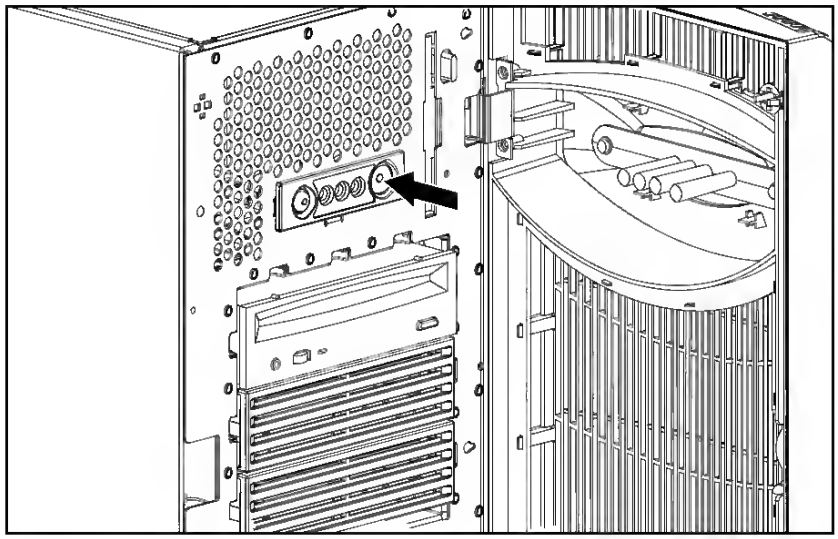

Figure 2-3. Pressing the Power On/Standby button

5. Disconnect all AC power cords from the AC outlets, then from the server.
6. Disconnect all external peripheral devices from the server.
7. Place the server on a sturdy, level surface.

Removing the Server from the Rack

You need to remove the server from the rack when performing non-hot-plug removal and replacement procedures. To remove the server from the rack:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Disconnect all AC power cords from the AC outlets, then from the server.
3. Disconnect all external peripheral devices from the server.
4. Remove the cable management arm from the server.
5. Loosen the thumbscrews that secure the front bezel to the front of the rack.
6. Slide the server out of the rack.
7. Place the server on a sturdy, level surface.

Hot-Plug Procedures

You can perform some service procedures as hot-plug procedures without powering down the server. Before performing hot-plug procedures, observe the following guidelines:

- For hot-plug fan procedures, ensure that the fan zone is fully populated.
- For hot-plug power supply procedures, ensure that a redundant power supply is installed.
- For hot-plug drive procedures, determine whether the drive is part of an array. For more information, refer to the "Hot-Plug SCSI Hard Drive Replacement Guidelines" in the *Compaq Servers Troubleshooting Guide*.
- For hot-plug expansion board procedures, ensure that the proper drivers for PCI Hot Plug functionality are installed. For more information, refer to the *Compaq ProLiant ML370 Generation 2 Server Setup and Installation Guide*.

Feet

This procedure applies to ProLiant ML370 Generation 2 tower servers only. To remove the feet:

1. Place the server on its side.
2. Press down on the tab on the foot ❶.
3. Slide the foot out of the locking slot and pull it off the chassis ❷.

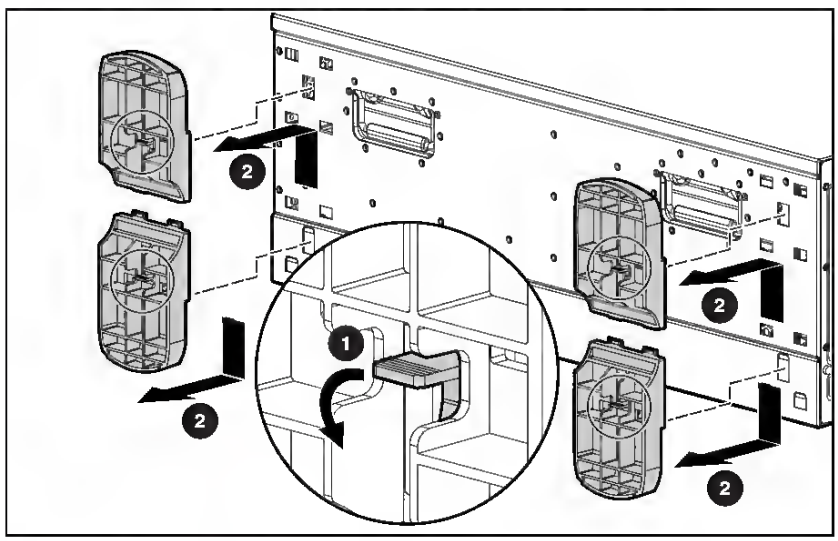

Figure 2-4. Removing the feet

4. Repeat steps 3 and 4 for the other feet.

To replace a foot, slide it back on to the locking slot; repeat with remaining feet. Ensure that each foot snaps securely into its holder.

Front Bezel

This procedure applies to ProLiant ML370 Generation 2 tower servers only. To remove the front bezel:

1. Unlock and open the front bezel.
2. Lift the front bezel and remove it from the chassis.

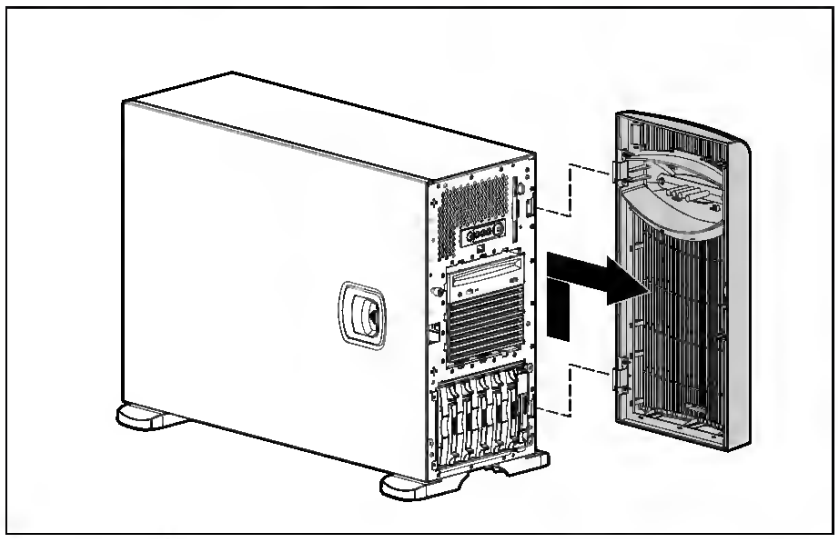

Figure 2-5. Removing the front bezel

To replace the front bezel, reverse steps 1 and 2.

Access Panel

WARNING: To reduce the risk of personal injury from hot surfaces, allow internal system components to cool before touching them.

To remove the access panel:

1. Unlock the front bezel (tower server only). See "Front Bezel" in this chapter.

IMPORTANT: You must unlock the tower bezel before removing the access panel.

2. Push the release latch securing the access panel to the chassis ❶.
3. While holding the release latch down, slide the large access panel back about 1.5 cm (0.6 inches), then pull it away from the chassis ❷.

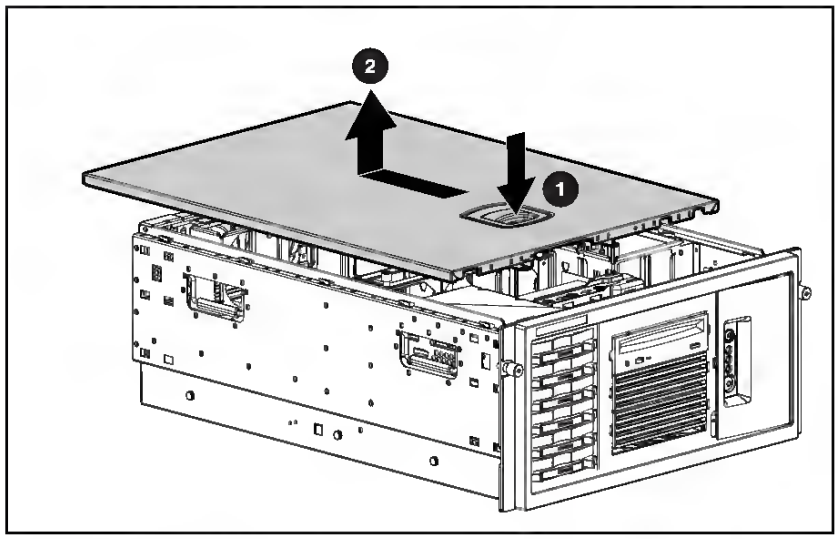

Figure 2-6. Removing the access panel

To replace the access panel, reverse step 3. When the release latch snaps into place, the access panel is secure.

Rack Bezel

This procedure applies to ProLiant ML370 Generation 2 rack servers only. To remove the rack bezel:

1. Remove the access panel. See "Access Panel" in this chapter.
2. Loosen the internal rack bezel thumbscrews.

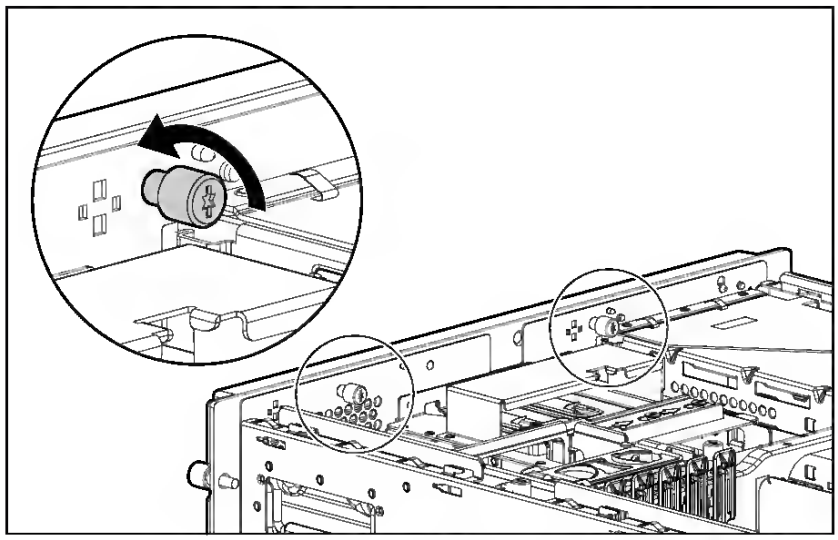

Figure 2-7. Loosening the rack bezel thumbscrews

3. Slide the bezel up to release the spools from the keyholes and pull it away from the server.

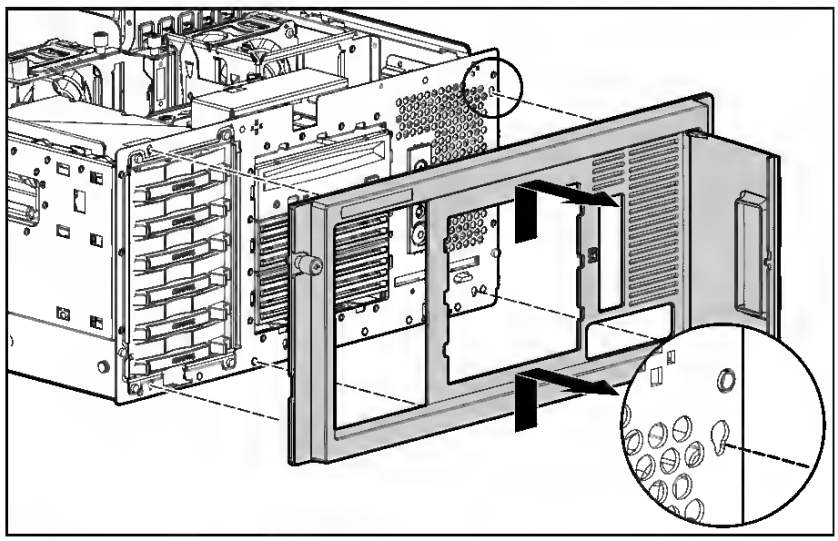

Figure 2-8. Removing the rack bezel

To replace the rack bezel, reverse steps 2 and 3.

Rack Rails

This procedure applies to ProLiant ML370 Generation 2 rack servers only. To remove the rack rails:

1. Use the Torx T-15 tool to push in the release key ❶

   NOTE: The Torx T-15 tool is clipped to the rear panel of the server to the right of the right-most fan grating.

2. Press the rail against the side of the chassis and slide it to the front of the server to release the rails ❷.
3. Align the four keyholes above the four spools on the side of the chassis and remove the rail ❸.

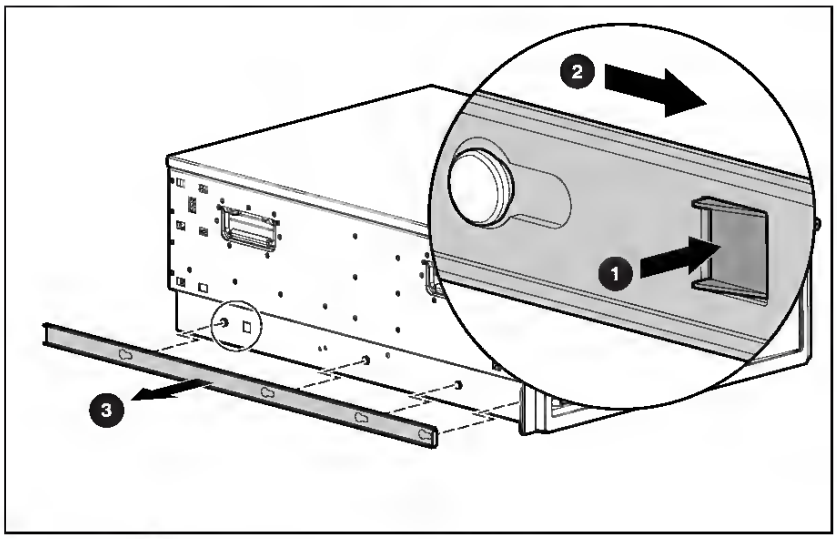

Figure 2-9. Pressing the release key

4. Repeat steps 1 through 3 to remove the other rail.

To replace the rack rails, reverse steps 2 and 3.

Power Supply Blank

To remove a power supply blank:

1. Remove the two screws with the Torx T-15 tool ❶.

   NOTE: The Torx T-15 tool is clipped to the rear panel of the server to the right of the right-most fan grating.

2. Remove the power supply blank ❷.

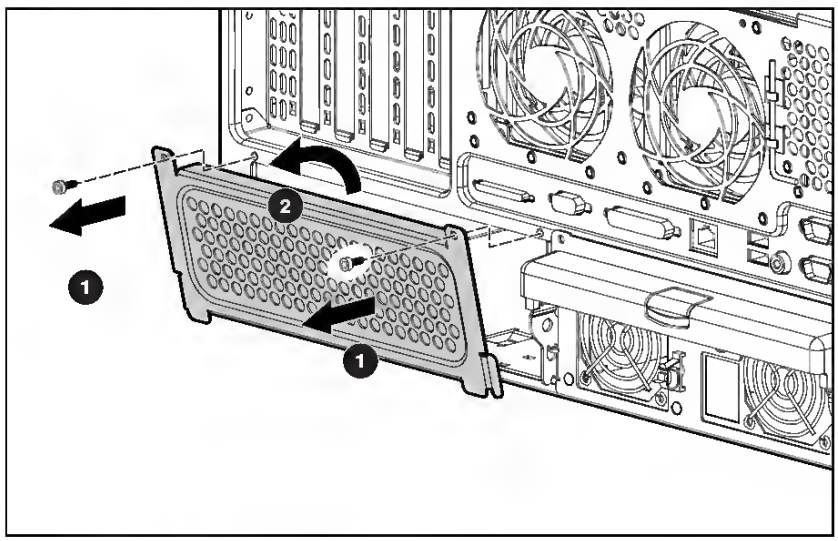

Figure 2-10. Removing a power supply blank

To replace the power supply blank, reverse steps 1 and 2.

IMPORTANT: Populate bays with either a power supply or a blank. Proper airflow can only be maintained when the bays are populated. Unpopulated power supply bays can lead to improper cooling and thermal damage.

To replace the blank with a redundant power supply, refer to "Hot-Plug Power Supply" in this chapter.

Hot-Plug Power Supply

WARNING: To reduce the risk of electrical shock, do not disassemble the power supply or attempt to repair it. Replace only with the specified Compaq spare part numbers.

CAUTION: Do not attempt to remove and replace a power supply as a hot-plug procedure unless both bays are populated with power supplies.

To remove the hot-plug power supply:

1. Remove the power cord from the unit to be removed.
2. Use the Torx T-15 tool to remove the shipping screws securing the handle.

   NOTE: The Torx T-15 tool is clipped to the rear panel of the server to the right of the right-most fan grating.

3. Press the port-colored button on the power supply handle to release the latch ❶ and pull the handle down ❷.
4. Slide the hot-plug power supply out of the chassis ❸.

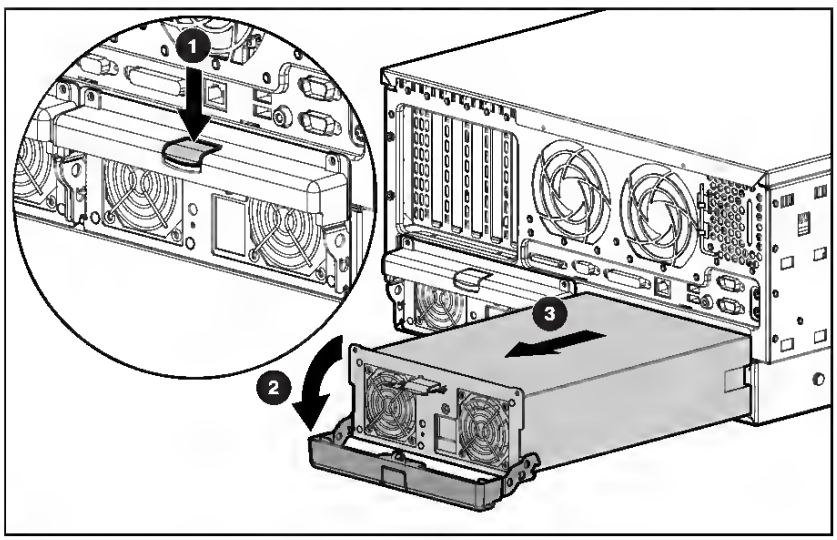

Figure 2-11. Disconnecting the power supply from the chassis

CAUTION: Always populate power supply bays with either a power supply or blank. Operating the server without installing a power supply or blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the power supply:

1. Slide the power supply into the bay.
2. Raise the handle and press it against the chassis to lock the power supply into the bay.

Hard Drive Blank

IMPORTANT: A device or blank must occupy each bay during operation.

To remove a hard drive blank:

1. Unlock and open the front bezel door (tower server only).
2. Squeeze in the tab ❶ and pull the blank out of the hard drive cage ❷.

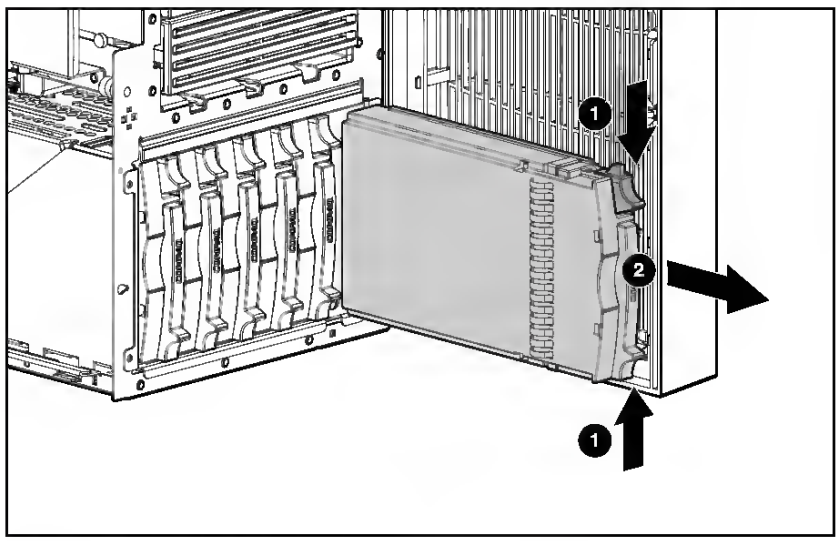

Figure 2-12. Removing a hard drive blank

CAUTION: Always populate drive bays with either a hard drive or blank. Operating the server without installing a hard drive or blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the hard drive blank, slide the blank into the bay until it locks into place.

Hot-Plug SCSI Hard Drive:

To remove a hot-plug SCSI hard drive:

1. Unlock and open the front bezel door (tower server only).
2. Press the port-colored release button ❶ and swing the locking latch outward ❷.
3. Pull the hot-plug SCSI hard drive out of the bay ❸.

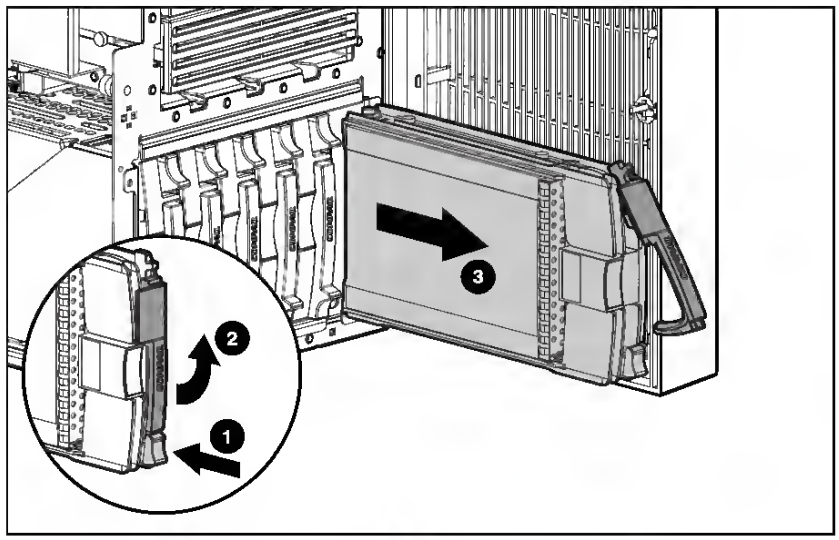

Figure 2-13. Removing a hot-plug SCSI hard drive

CAUTION: Always populate drive bays with either a hard drive or blank. Operating the server without a hard drive or blank results in improper airflow and improper cooling that can lead to thermal damage.

IMPORTANT: Always populate hard drive bays starting with the lowest SCSI ID.

To replace the hot-plug SCSI hard drive:

1. Insert the hard drive into the available drive bay. Ensure that the drive seats firmly into the connector on the SCSI backplane.
2. Press the locking latch in to secure the drive in the drive cage.

Media Blanks

NOTE: It is recommended that you remove or extend the CD-ROM drive to ease bezel blank removal.

To remove a bezel blank:

1. Remove the front bezel (tower server only). See "Front Bezel" in this chapter.
2. Remove the access panel. See "Access Panel" in this chapter.
3. Slide the media latch to release the blanks ❶ while pushing out the bezel blanks from behind ❷.

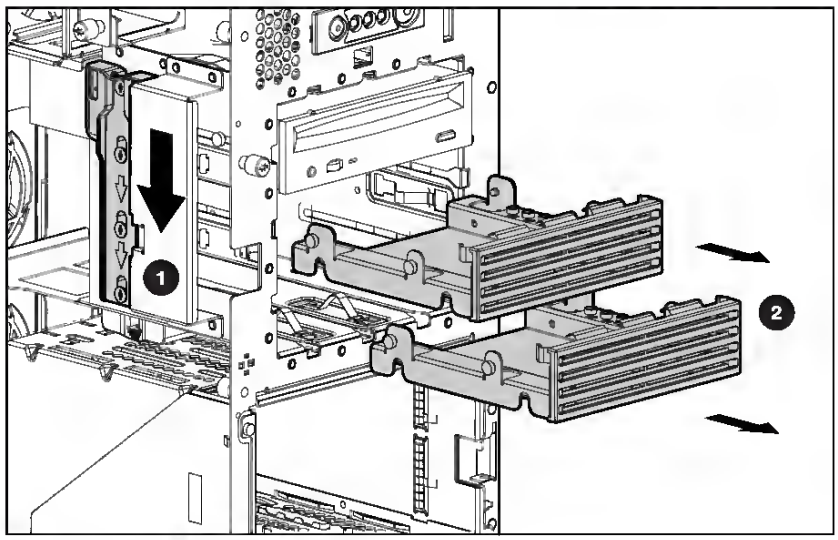

Figure 2-14. Removing the bezel blanks

CAUTION: Always populate drive bays with either a hard drive or blank. Operating the server without installing a hard drive or blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace a bezel blank, slide it back into the chassis.

System Fans

All fans are identical. This procedure can be used for any one of the six fan positions. To remove the fans:

1. Unlock the front hezel (tower server only).
2. Remove the access panel. See "Access Panel" in this chapter.
3. Grasp the plastic handle at the top of the fan and pull upward ❶.
4. Lift the hot-plug fan out of the fan cage ❷.

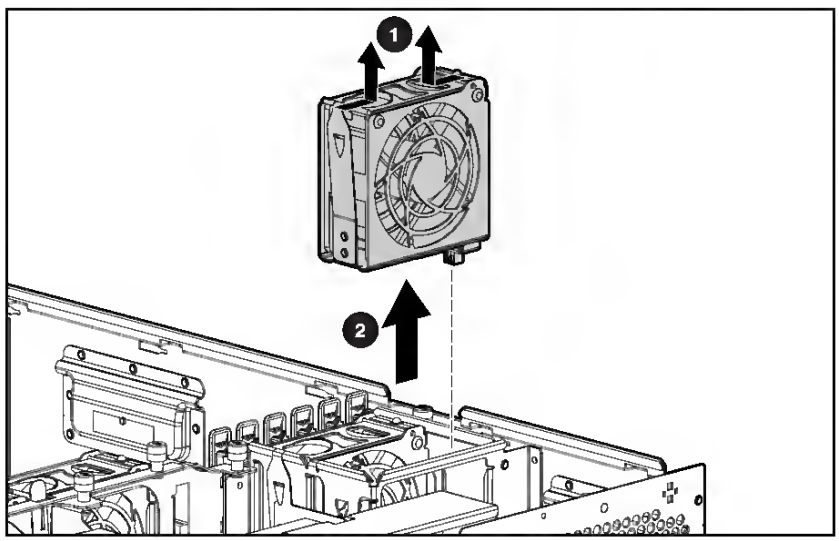

Figure 2-15. Removing a system fan

To replace the hot-plug fan, slide it into a fan cage slot and press down until the fan is seated securely. Verify that the fan's LED is green to ensure that it is working.

PCI Hot Plug Expansion Boards

PCI Hot Plug expansion boards are located on slots 1 and 2. Refer to Figure 2-23 and Table 2-1 for identifying and locating PCI Hot Plug expansion board slots. To remove PCI expansion boards from slots 1 and 2:

IMPORTANT: PCI Hot Plug expansion boards can be removed without powering down the server, if necessary. Only use these instructions if you plan to power down the server.

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Push the PCI Hot Plug button to remove power from the slot.
5. Ensure that the slot LEDs are off. Powering down the slot may take up to one minute.

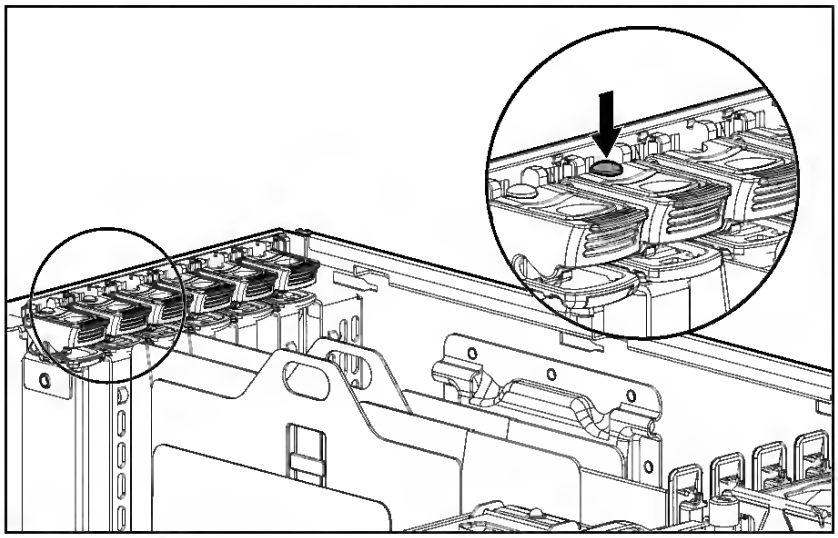

Figure 2-16. Pushing the PCI Hot Plug button

6. Disconnect any peripheral devices and cabling attached to the expansion board.

7. Release the PCI guide clip from either slot 1 or 2.

NOTE: The dividers, divider base, and expansion boards are removed from the illustration for clarity.

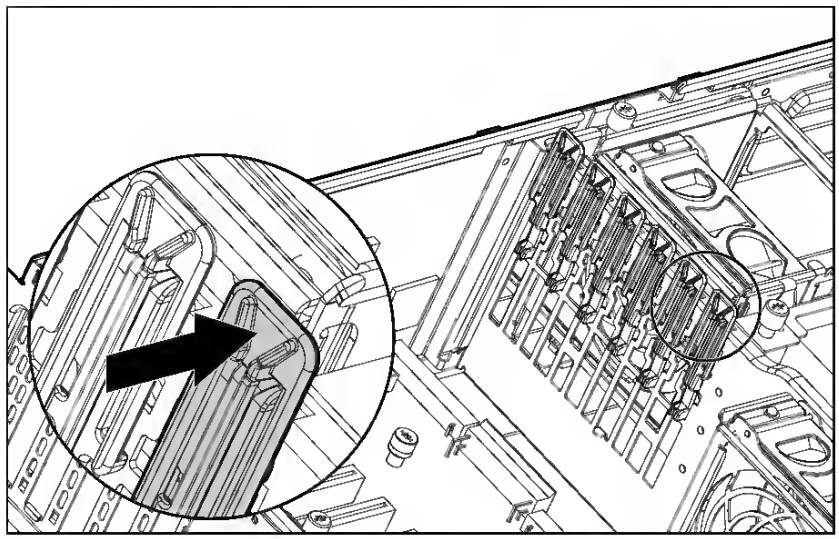

Figure 2-17. Releasing a PCI guide clip

8. Press down on the top of the PCI slot release lever ❶ and swing the release lever upward ❷.
9. Hold the PCI ejector wall down with one hand and pull the handle of the PCI Hot Plug card ejector upward with the other until the board is released from the slot ❸.
10. Lift the expansion board out from the server.

IMPORTANT: Make note of board locations. Be sure to install replacements in the same slots.

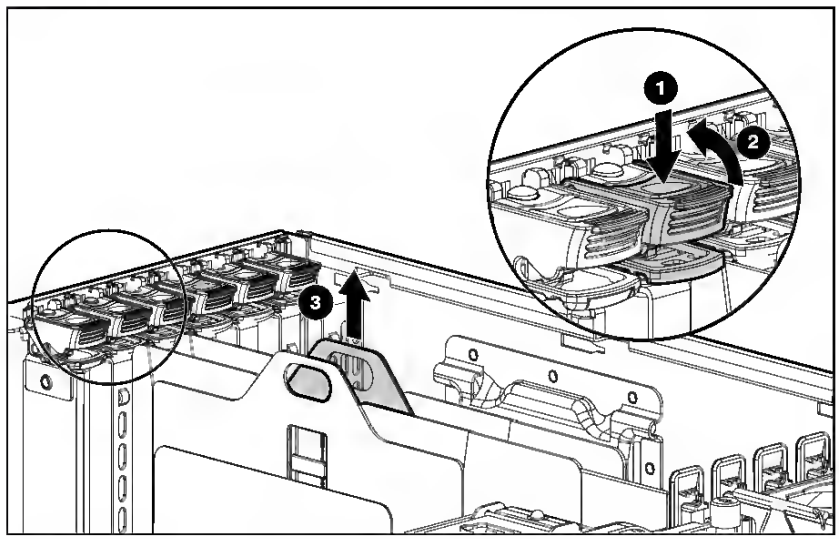

Figure 2-18. Removing a PCI Hot Plug expansion board

CAUTION: Always install either an expansion board or an expansion slot cover. Operating the server without installing an expansion card or slot cover results in improper airflow and improper cooling that can lead to thermal damage.

To replace a PCI Hot Plug expansion board in slots 1 or 2:

1. Position the expansion board above the expansion slot and use the PCI guide to align the board with the slot.
2. Press down on the expansion board to seat it in the slot.
3. Press the PCI slot release lever down until it clicks into place to lock the slot.
4. If the PCI guide clip does not snap forward to secure the board, pull it into a locked position manually.
5. Push the PCI button to power the slot back up.

Non-Hot-Plug Procedures

You must power down the ProLiant ML370 Generation 2 server to perform non-hot-plug removal and replacement procedures. The procedures in this section are for non-hot-plug service items, regardless of rack type or environment.

Redundant Fan Cage

To remove the redundant fan cage:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the fans from the redundant fan cage. See "System Fans" in this chapter.
5. Loosen the two thumbscrews securing the redundant fan cage retaining bracket to the chassis ❶.
6. Remove the bracket from the chassis ❷.

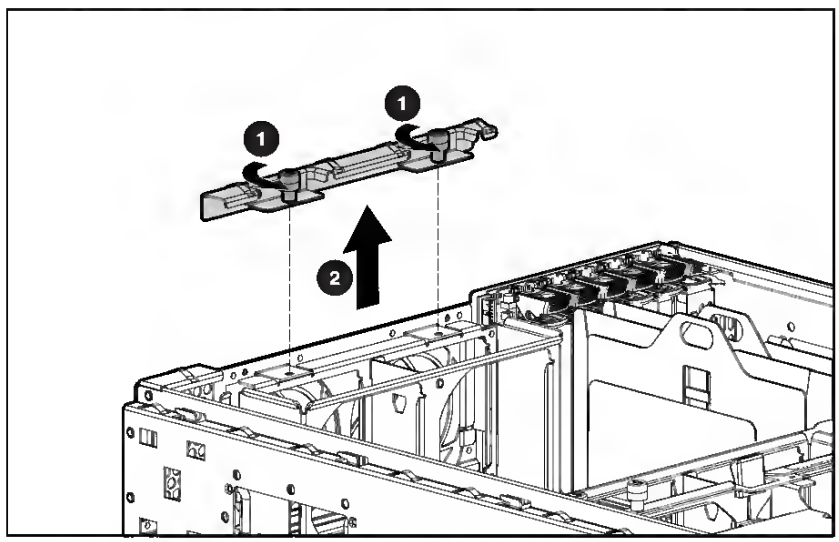

Figure 2-19. Removing the redundant fan cage retaining bracket

7. Remove the redundant fan cage from the chassis.

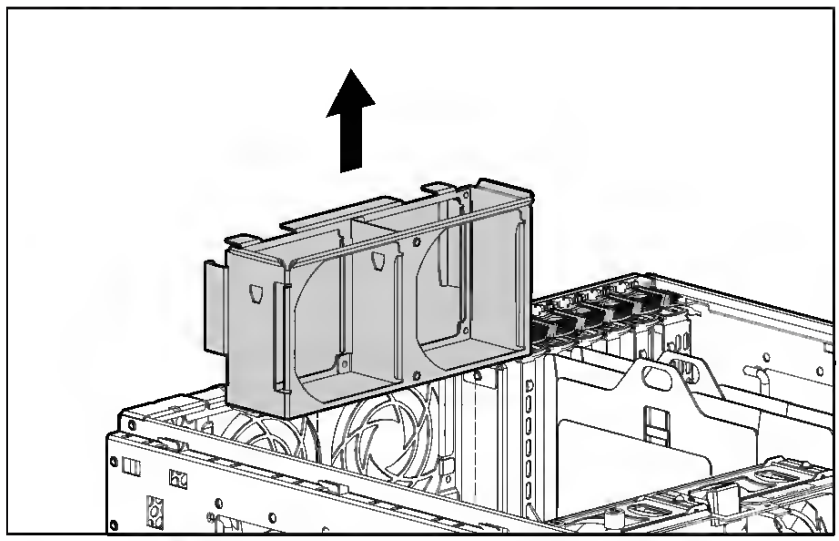

Figure 2-20. Removing the redundant fan cage

To replace the redundant fan cage, reverse steps 5 through 7.

Hard Drive Cage

To remove the hot-plug drive cage:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Remove the tower or rack front bezel. See "Front Bezel" or "Rack Bezel" in this chapter.
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove all hard drives and blanks. See "Hard Drive Blank" and "Hot-Plug SCSI Hard Drive" in this chapter.
5. Remove the point-to-point SCSI cable from the SCSI hard drive backplane and system board ❶.
6. Remove the power cable from the SCSI hard drive backplane ❷.

NOTE: The center wall is removed from the illustration for clarity.

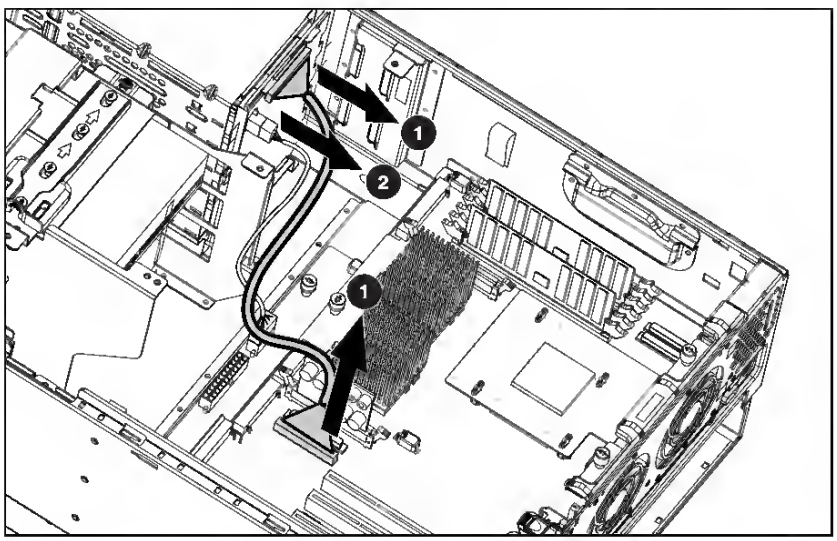

Figure 2-21. Removing the SCSI and power cable from the hot-plug hard drive cage

7. Remove the four T-15 screws securing the hard drive cage to the chassis ❶.

NOTE: The Torx T-15 tool is clipped to the rear panel of the server to the right of the right-most fan grating.

8. Slide the hot-plug drive cage out through the front of the chassis ❷.

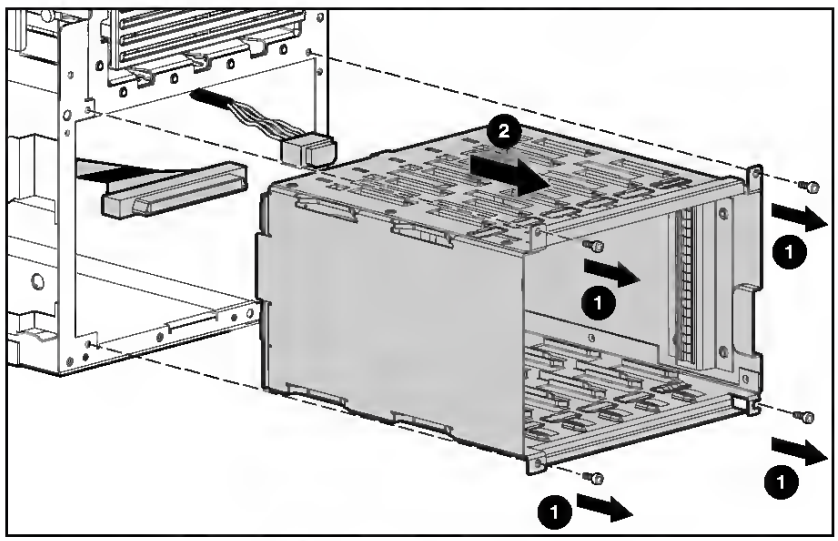

Figure 2-22. Removing the hard drive cage

To replace the hot-plug drive cage, reverse steps 5 through 8.

CAUTION: When routing cables, ensure that the cables are not located where they can be pinched or crimped.

IMPORTANT: Ensure that all power and signal cables to the hard drive cage are reseated properly.

PCI Expansion Slots

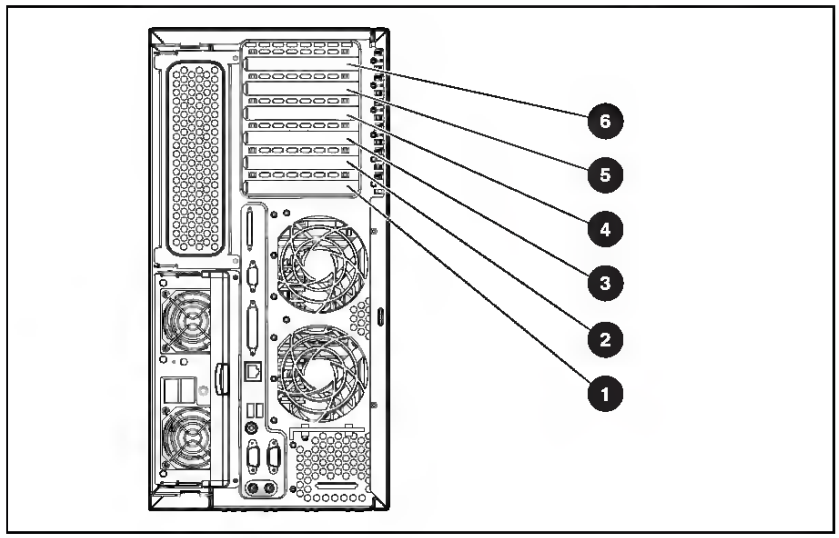

Figure 2-23. PCI expansion board slots

Table 2-1
PCI Expansion Board Slots

Item	Description
❶	PCI bus expansion slot 1 (64-bit, 66-MHz, hot-plug capable)
❷	PCI bus expansion slot 2 (64-bit, 66-MHz, hot-plug capable)
❸	PCI bus expansion slot 3 (64-bit, 33-MHz, non-hot-plug capable)
❹	PCI bus expansion slot 4 (64-bit, 33-MHz, non-hot-plug capable)
❺	PCI bus expansion slot 5 (64-bit, 33-MHz, non-hot-plug capable)
❻	PCI bus expansion slot 6 (64-bit, 33-MHz, non-hot-plug capable)

PCI Expansion Slot Cover

To remove a PCI expansion slot cover:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Press down on the top of the PCI slot release lever ❶ and swing the release lever upward ❷.
5. Lift the expansion slot cover out of the server ❸.

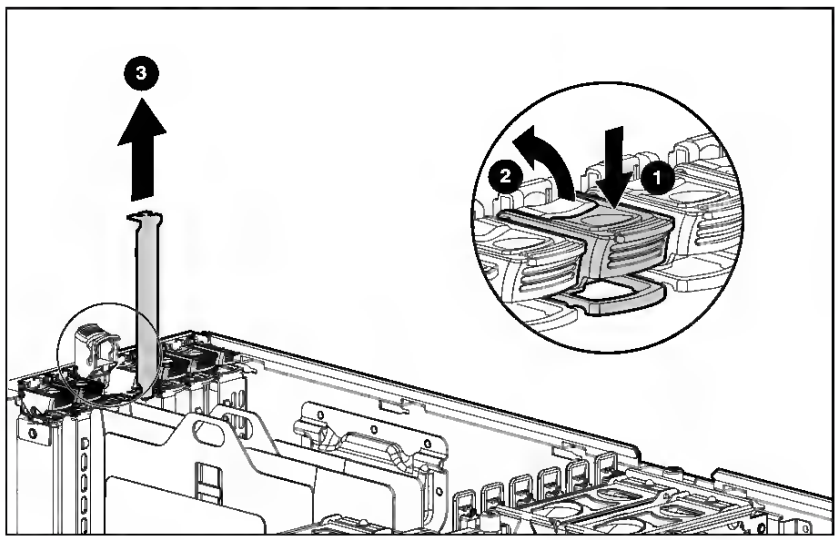

Figure 2-24. Removing a PCI expansion slot cover

To replace a PCI expansion slot cover, reverse steps 4 and 5.

Non-Hot-Plug PCI Expansion Boards

To remove a non-hot-plug PCI expansion board:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove any peripheral devices and cabling attached to the expansion board.
5. Release the PCI guide clip.

NOTE: The dividers and divider base are removed from this illustration for clarity.

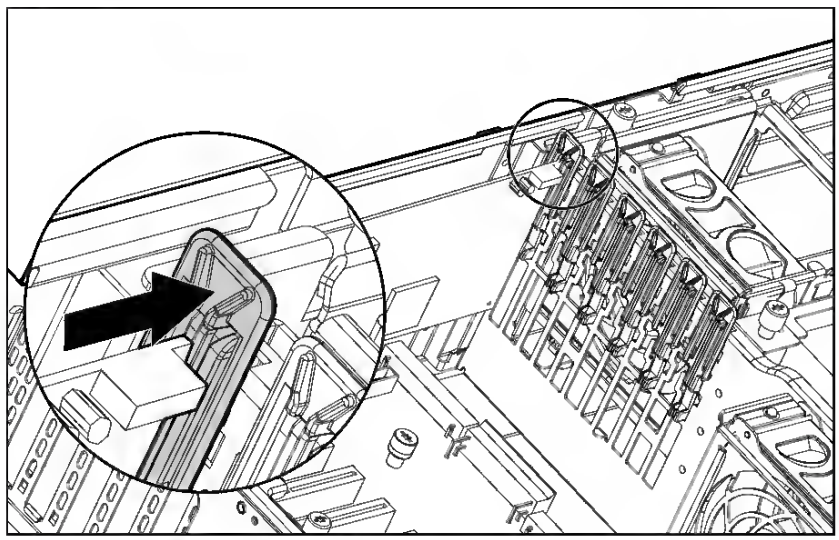

Figure 2-25. Releasing a PCI guide clip

6. Press the PCI slot release lever ❶ and swing the slot release lever upward ❷.
7. Lift the expansion board out from the server ❸.

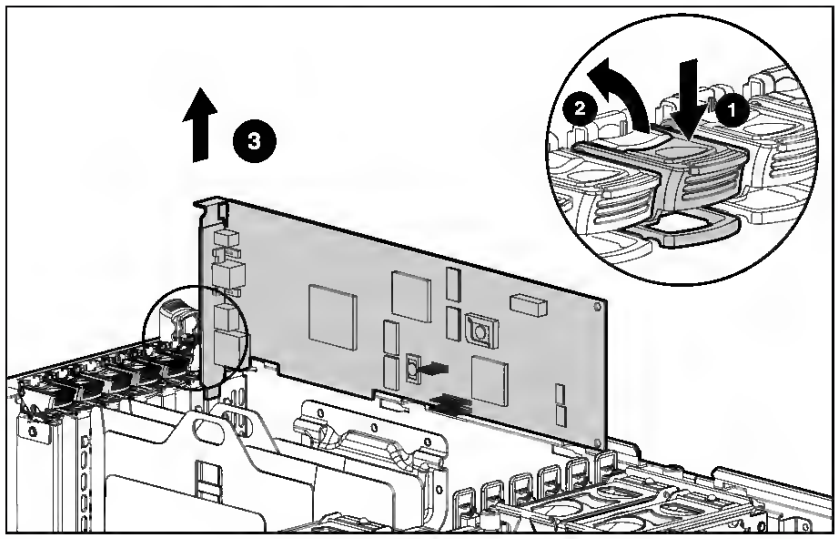

Figure 2-26. Removing a non-hot-plug PCI expansion board

IMPORTANT: Make note of board locations. Be sure to install replacements in the same slots.

To replace a non-hot-plug PCI expansion board:

1. Position the expansion board above the expansion slot and use the PCI guide to align the board with the slot.
2. Press down on the expansion board to seat it in the slot.
3. Press the PCI slot release lever down until it clicks into place to lock the slot.
4. If the PCI guide clip does not snap forward to secure the board, pull it into a locked position manually.

CAUTION: Always install either an expansion board or an expansion slot cover. Operating the server without installing an expansion card or slot cover results in improper airflow and improper cooling that can lead to thermal damage.

PCI Hot Plug Dividers

To remove the PCI Hot Plug dividers:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the expansion boards from the PCI Hot Plug slots. See "PCI Hot Plug Expansion Boards" in this chapter.
5. Use the Torx T-15 tool to press down on the divider release latch ❶.
6. Slide the divider toward the center wall approximately 6 mm (about ¼ inch) ❷.
7. Remove the divider from the base ❸.
8. Repeat steps 5 through 7 for the second divider.

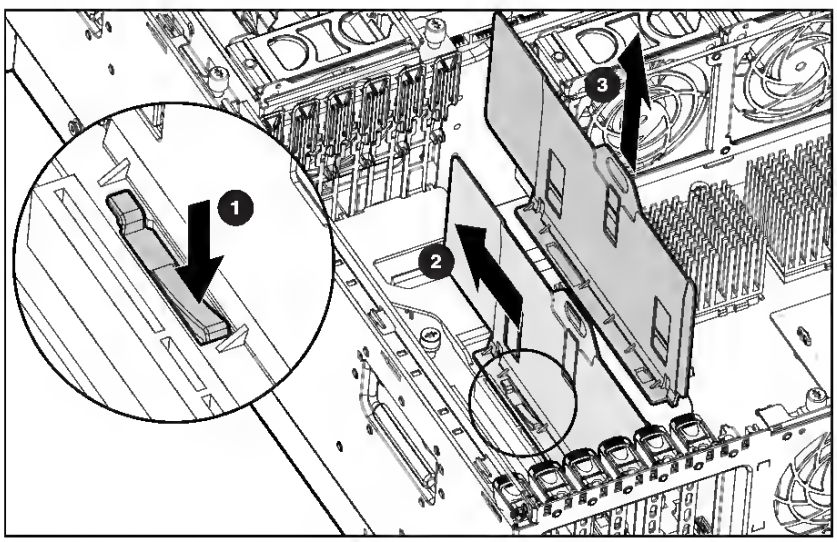

Figure 2-27. Removing a PCI Hot Plug divider

To replace the dividers:

1. Align one of the dividers with the locking latch on the divider base.
2. Slide the divider toward the rear of the server until it snaps into place.

PCI Slot Release Lever

To remove a PCI slot release lever:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the expansion slot cover. See "PCI Expansion Slot Cover" in this chapter.
5. From behind the chassis, push up on the lever locking tab ❶.
6. Pull the release lever forward to disengage the rear tabs from the server wall ❷.

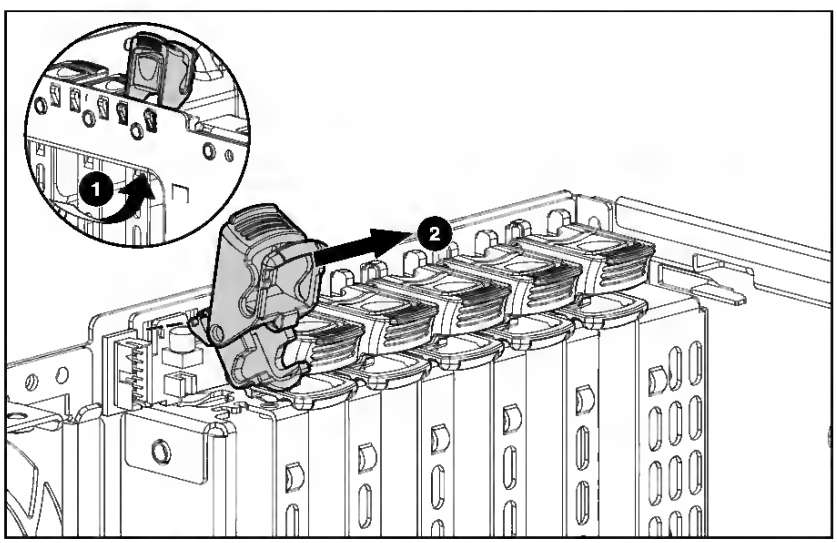

Figure 2-28. Removing a slot release lever

7. Remove the slot release lever from the chassis.
8. Repeat steps 5 through 7 to remove other slot release levers.

To replace slot release levers, reverse steps 6 and 7.

PCI Hot Plug Backplane Cable

To remove the PCI Hot Plug backplane cable:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the PCI Hot Plug backplane cable from the backplane and from the system board.

   NOTE: The PCI Hot Plug backplane cable attaches to the server wall with adhesive. When replacing the cable, peel off the adhesive protector from the replacement cable to ensure good contact with the wall.

5. Remove the backplane cable from the server wall.

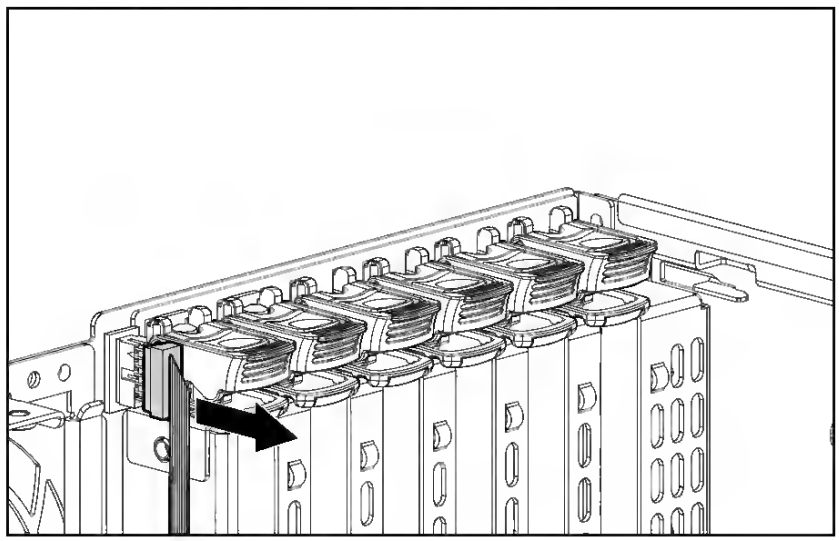

Figure 2-29. Removing the PCI Hot Plug backplane cable

To replace the PCI Hot Plug backplane cable, reverse steps 4 and 5.

PCI Hot Plug Backplane

To remove the PCI Hot Plug backplane:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the PCI expansion boards from slots 1 and 2. See "PCI Hot Plug Expansion Boards" in this chapter. If no boards are installed in slots 1 and 2, remove the expansion slot covers. See "PCI Expansion Slot Cover" in this chapter.
5. Remove the PCI slot release levers from slots 1 and 2. See "PCI Slot Release Lever" in this chapter.
6. Remove the PCI Hot Plug backplane cable. See "PCI Hot Plug Backplane Cable" in this chapter.
7. Remove the backplane from the server.

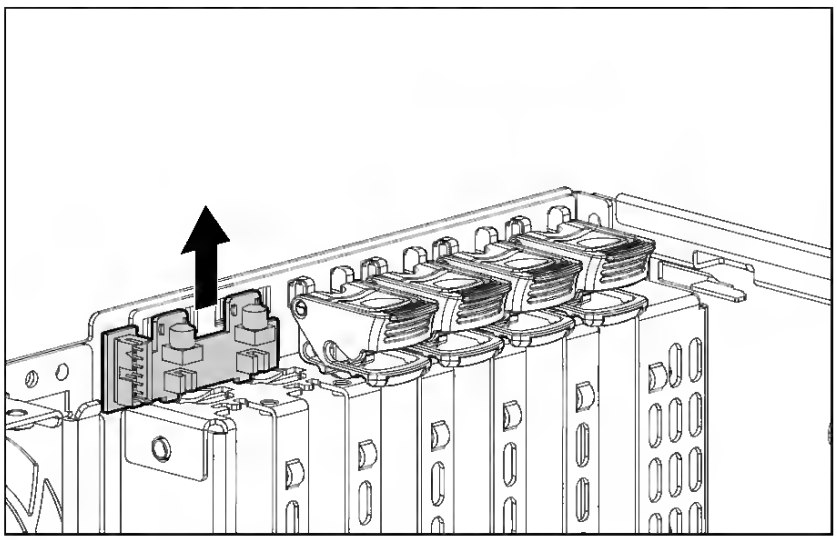

Figure 2-30. Removing the PCI Hot Plug backplane

To replace the PCI Hot Plug backplane, reverse steps 6 and 7.

PCI Guide Clips

To remove a PCI guide clip:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the PCI expansion boards. See "Non-Hot-Plug PCI Expansion Boards" in this chapter.
5. Pull the bottom of the clip out ❶ while pushing down on the top of the guide clip ❷.
6. When the tabs align with the slots, pull the guide clip away from the center wall ❸.

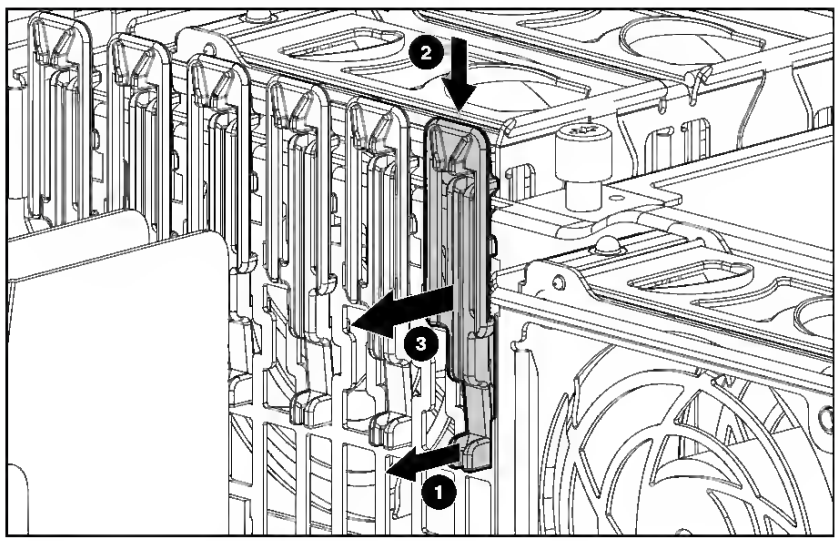

Figure 2-31. Removing a PCI guide clip

7. Remove the guide clip from the server.

To replace a PCI guide clip, reverse steps 5 through 7.

Center Wall

To remove the center wall:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the PCI expansion boards. See "Non-Hot-Plug PCI Expansion Boards" in this chapter.
5. Loosen the four thumbscrews ❶ and lift the wall up enough to reach the fan cable ❷.

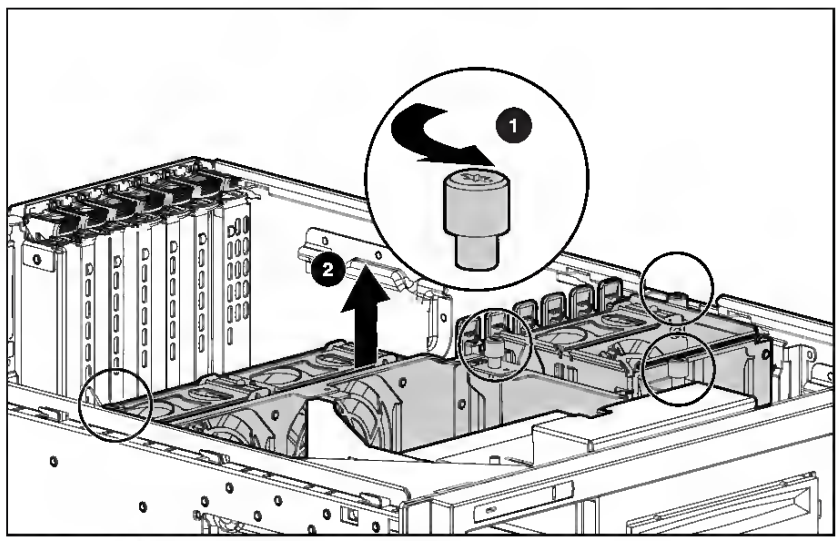

Figure 2-32. Disengaging the center wall

6. Remove the fan cable from the system board.

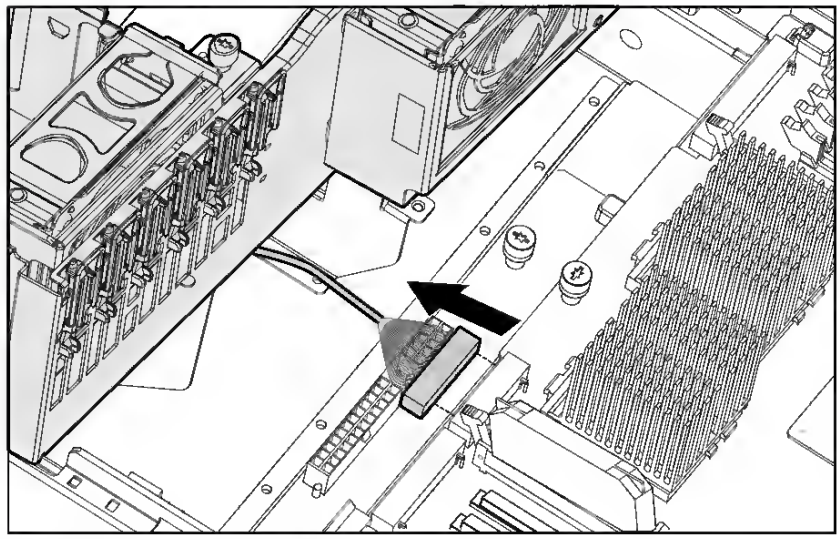

Figure 2-33. Removing power cabling

7. Lift the center wall away from the chassis.

To replace the center wall, reverse steps 5 through 7.

IDE CD-ROM Drive

To remove the CD-ROM drive:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Slide the media latch to release the drive ❶ while pushing the CD-ROM drive from inside the chassis slightly out of the bay ❷. To remove the drive in a rack configuration, press down on the media latch located on the side of the drive cage.

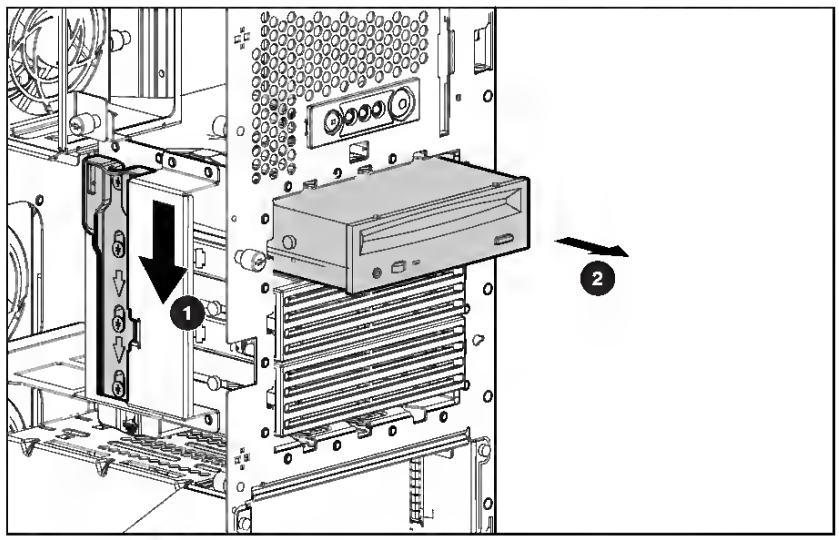

Figure 2-34. Partially removing the CD-ROM drive

CAUTION: Always populate the CD bay with either a CD-ROM drive or a CD blank. Operating the server without installing a CD-ROM drive or CD blank results in improper airflow and improper cooling that can lead to thermal damage.

5. Disconnect the IDE cable from the CD-ROM drive and system board ❶.
6. Disconnect the power cable from the CD-ROM drive ❷.

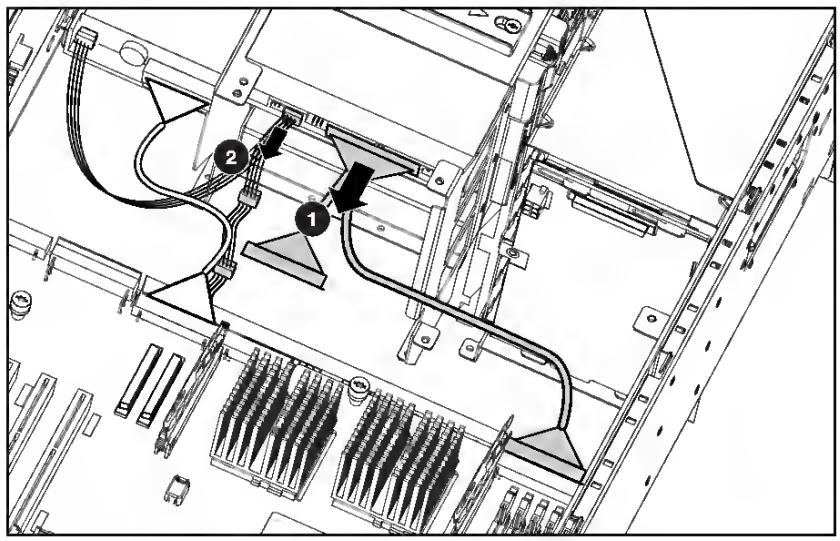

Figure 2-35. Disconnecting CD-ROM cables

7. Remove the CD-ROM drive from the chassis.

To replace the CD-ROM drive:

1. Slide the drive balfway into the bay.
2. Connect any required cables to tbe drive.
3. Slide the CD-ROM drive fully into the bay until it is seated securely.

CAUTION: When routing cables, ensure that the cables are not located where they can be pinched or crimped

Power Button/LED Assembly

To remove the power button/LED assembly:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Disconnect the power button/LED cable from the system board and the power supply backplane.

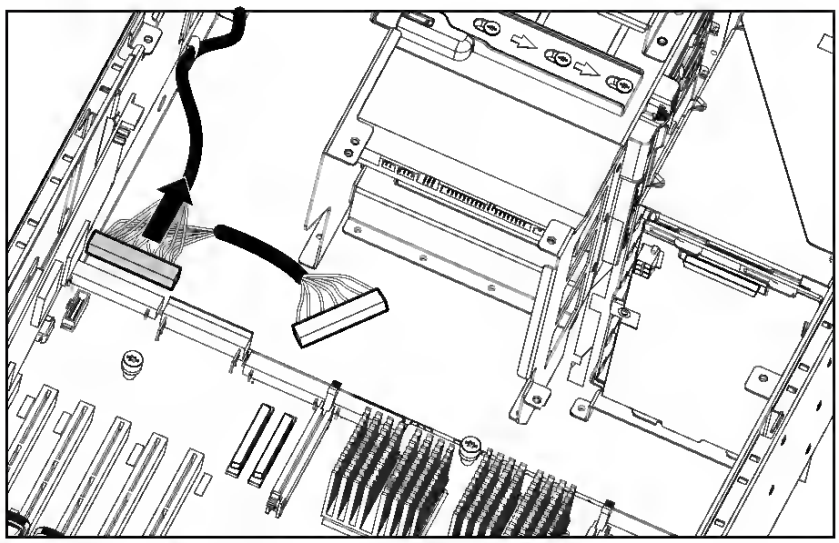

Figure 2-36. Removing the power button/LED assembly cable

5. Release the cable from the clip on the chassis wall.

6. Squeeze the two tabs from the inside ❶ and slide the power button/LED assembly through the front of the server ❷.

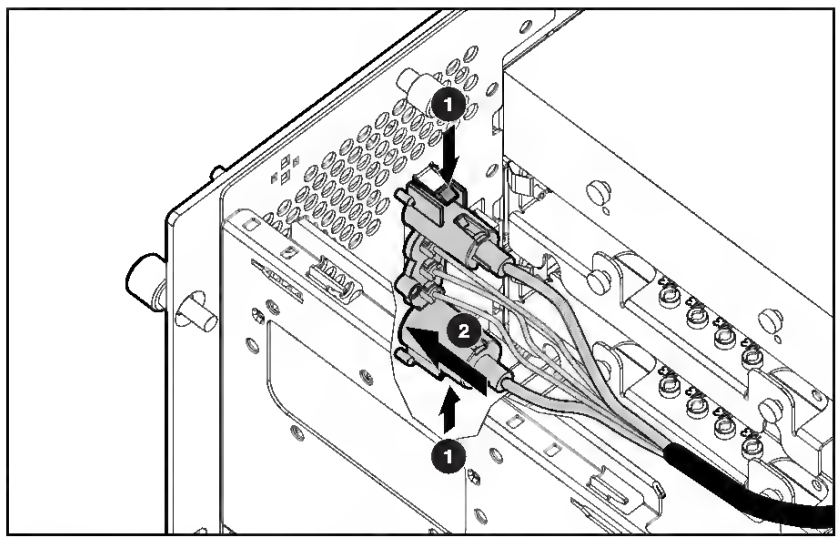

Figure 2-37. Removing the power button/LED assembly

7. Remove the assembly from the chassis.

To replace the power button/LED assembly, push the assembly and the cables through the front of the server. Ensure that the assembly is seated securely.

Diskette Drive

To remove the diskette drive:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the PCI expansion boards. See "Non-Hot-Plug PCI Expansion Boards" in this chapter.
5. Remove the center wall. See "Center Wall" in this chapter.
6. Remove the power button/LED assembly. See "Power Button/LED Assembly" in this chapter.
7. Disconnect the floppy cable from the diskette drive and the system board ❶.
8. Disconnect the power cable from the diskette drive ❷.

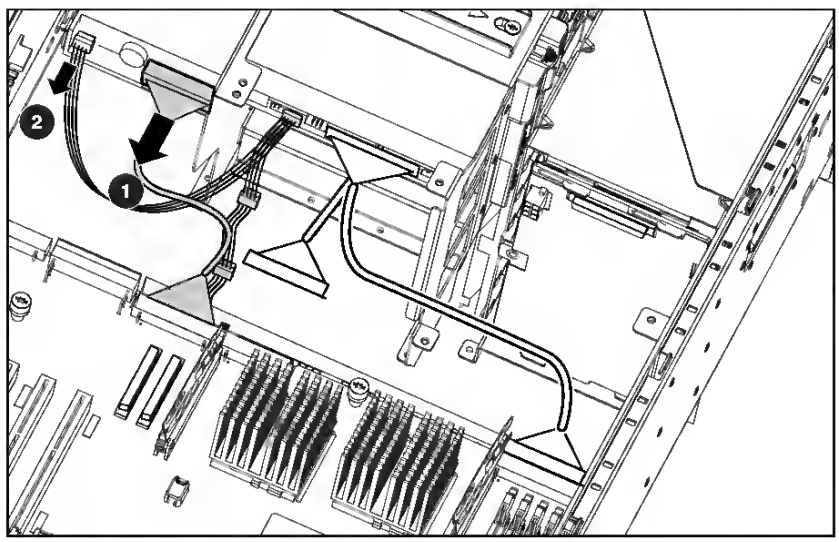

Figure 2-38. Removing cables from the diskette drive

9. Loosen the thumbscrew that secures the retaining bracket to the diskette chassis ❶.
10. Pull the diskette retaining bracket forward to disengage the tabs and lift the bracket from the chassis ❷.
11. Pull the diskette drive backward about 1 cm (0.4 inch) and lift up to clear the base ❸.

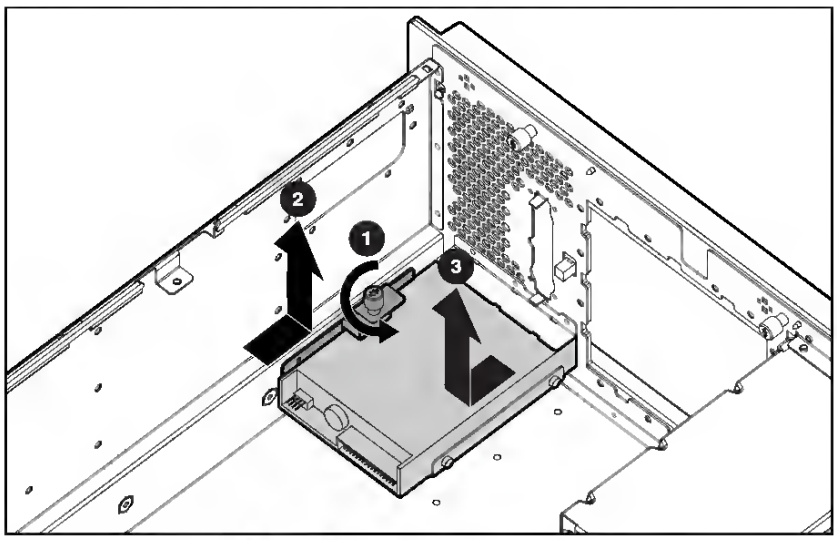

Figure 2-39. Removing the diskette drive

NOTE: The drive cage is removed for clarity.

12. Remove the diskette drive from the chassis.

To replace the diskette drive:

1. Place the diskette drive back into the chassis, flush with the front of the server.
2. Slide the diskette retaining bracket into place.
3. Secure the thumbscrew.
4. Reconnect the floppy cable to the diskette drive and the system board.
5. Reconnect the power cable to the diskette drive.

Processor Assembly

CAUTION: Ensure that you have the current version of the system ROM. Failure to flash your ROM with the correct version before installing or replacing the processor causes system failure. For the most current version of the ROM, visit the Compaq website:

www.compaq.com/support/files/server/us/

To remove a processor:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Release the heatsink retaining clip that secures the heatsink to the socket ❶.

IMPORTANT: Ensure that the clip clears the front and rear of the socket before removing the assembly.

5. Release the socket lever by pulling it away from the processor and then all the way up to a 90-degree angle ❷.
6. Pull the processor assembly from the server ❸.

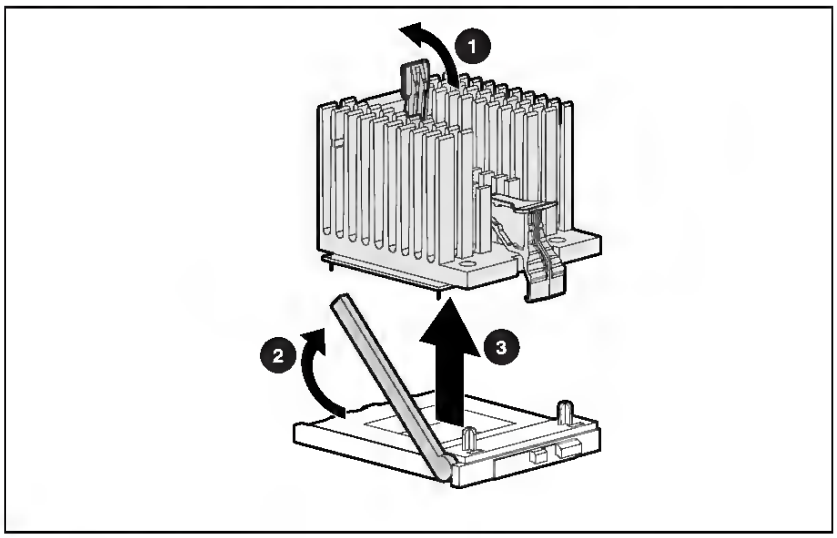

Figure 2-40. Removing a processor

7. Repeat steps 4 through 6 to remove a second processor assembly, if necessary.

To replace tbe processor assembly:

1. Raise the processor socket lever to open the socket.
2. Place the processor into the socket. Use the processor socket guide posts to align the processor.

   NOTE: The processor and socket are keyed to fit in one direction only. Use the holes to align with guiding pins.

3. Lower the socket latcb to secure the assembly in the socket.
4. Lift the heatsink retaining clip over the rear edge of the socket and hook underneath tbe socket tabs.
5. Clasp the front of the assembly clip over the front edge of the socket.
6. Press the assembly clip down to secure the heatsink and processor assembly in the socket.

   NOTE: When replacing a failed processor, run RBSU after replacing the new processor to mark the failed processor as repaired. Refer to the setup and installation guide for more detailed information on RBSU.

Processor Power Module

To remove a PPM:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Press outward on the latches at each end of the PPM socket ❶.
5. Lift the PPM out of the slot ❷.

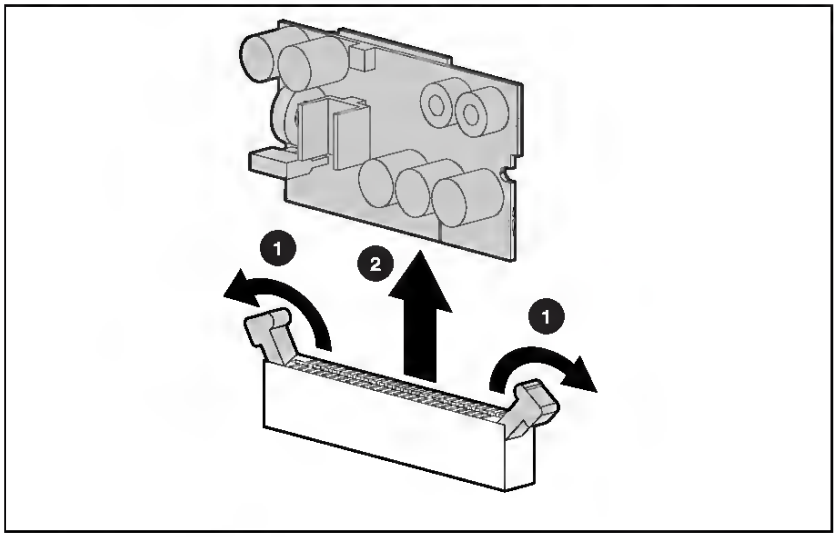

Figure 2-41. Removing a PPM

CAUTION: PPM slots must be populated when processors are installed. If PPM slots are not populated, the system does not boot.

IMPORTANT: PPMs do not seat if turned the wrong way.

To replace a PPM:

1. Position the PPM above the slot. The PPM is keyed to fit one way only in the slot.
2. Press evenly on the PPM to insert it into the slot until latches snap up to secure the module. The clips on the PPM snap into a locked position automatically when the module is fully seated in the slot. The module is keyed to ensure correct alignment.

Memory

Use the following figure and table to identify DIMM slots on the ProLiant ML370 Generation 2 server system board. The slots are numbered sequentially (1 through 6), and the paired banks are identified by the letters A, B, and C. Follow all installation guidelines listed in this chapter. Memory banks must be populated in pairs.

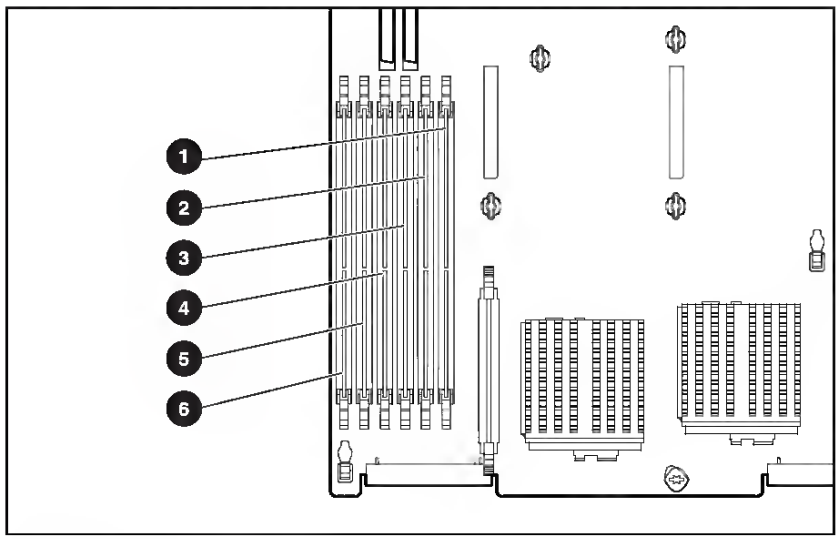

Figure 2-42. DIMM slots

Table 2-2
SDRAM DIMM Slot Locations

Item	Description
❶	SDRAM DIMM slot 1A
❷	SDRAM DIMM slot 2B
❸	SDRAM DIMM slot 3C
❹	SDRAM DIMM slot 4A
❺	SDRAM DIMM slot 5B
❻	SDRAM DIMM slot 6C

CAUTION: Use only Compaq DIMMs. DIMMs from other sources are known to adversely affect data integrity.

DIMM Installation Guidelines

The following guidelines **must** be followed when installing or replacing memory:

- Always install memory in pairs of two identical DIMMs.
- DIMMs installed in the ProLiant ML370 Generation 2 server must be 133-MHz registered SDRAM, 3.3-volts, 72-bits wide, and ECC.

- Do not install DIMM modules supporting different speeds. All DIMMs installed must be the same speed.
- Install each DIMM into both slots within a single bank (1A with 4A; 2B with 5B; 3C with 6C). To ease successive DIMM installation, upgrade memory by installing DIMM pairs into banks in sequential bank order, starting with bank B.

Removing DIMMs

To remove a DIMM:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Press both DIMM slot release latches outward ❶.
5. Lift the DIMM module out of the slot ❷.

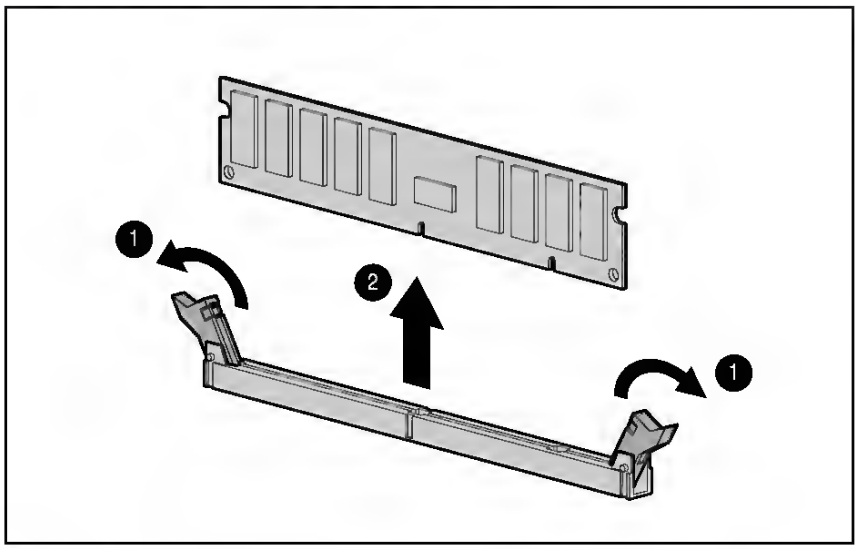

Figure 2-43. Removing a DIMM

6. Repeat steps 4 and 5 to remove other DIMMs.

CAUTION: Use only Compaq DIMMs. DIMMs from other sources may adversely affect data integrity.

IMPORTANT: DIMMs do not seat fully if turned the wrong way.

To replace the DIMMs:

1. Align the key slot in the bottom edge of the DIMM with the tab in the slot.
2. Press down evenly on the DIMM until it is seated securely in the slot and the latches close.

Power Supply Backplane

To remove the power supply backplane from the chassis:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove any bot-plug power supplies. See "Hot-Plug Power Supply."
5. Remove the PCI expansion boards. See "Non-Hot-Plug PCI Expansion Boards" in this chapter.
6. Remove the center wall. See "Center Wall" in this chapter.
7. Disconnect the diskette drive/CD power cable ❶, the power supply backplane cable ❷, and the power supply signal cable ❸ from the backplane.

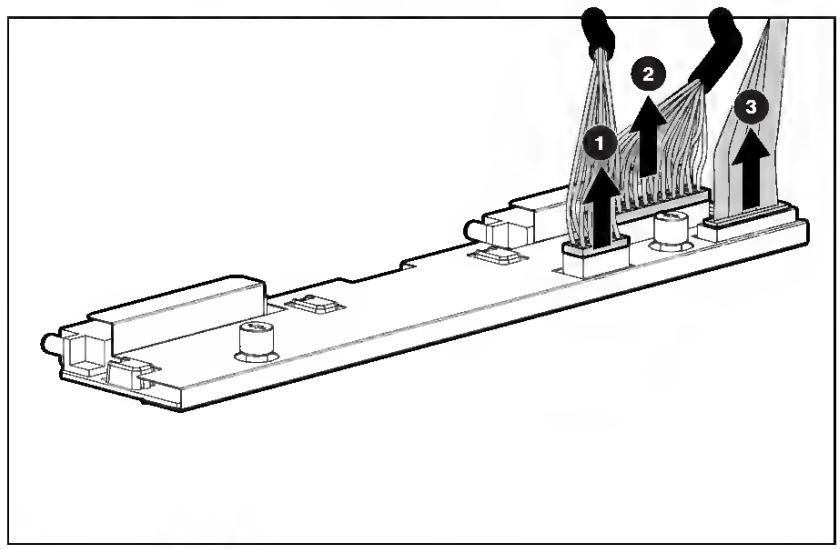

Figure 2-44. Removing cabling from the power supply backplane

8. Loosen the two thumbscrews securing the backplane to the chassis ❶.
9. Grasp the backplane, pulling toward the rear of the server to release it from the four retaining guides.
10. Lift the backplane away from the server ❷.

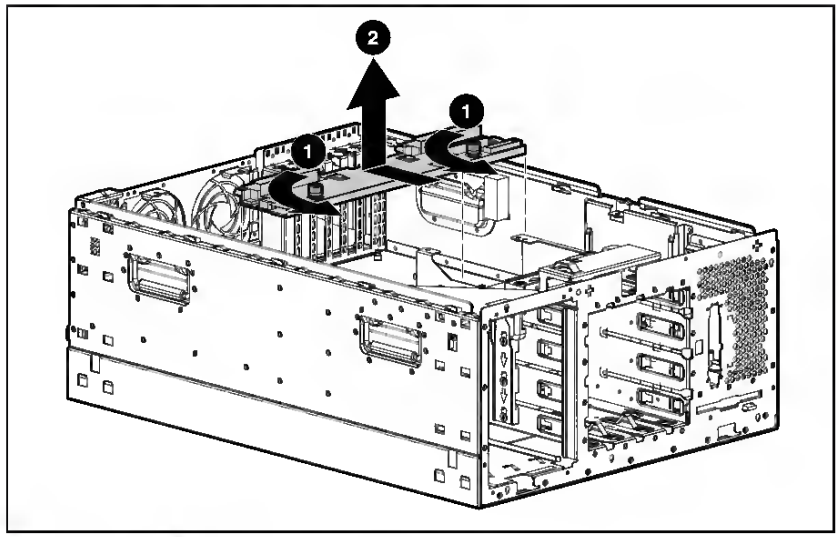

Figure 2-45. Removing the power supply backplane

To replace tbe power supply backplane, reverse steps 7 through 10.

NOTE: Ensure that you align the four retaining guides on the chassis with the holes on the power supply backplane when replacing it.

Smart Array 5i Controller

To remove the Smart Array 5i Controller:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the redundant fan cage, if installed. See "Redundant Fan Cage" in this chapter.
5. Rotate the tops of the four anchor pins so that they align with the anchor bases ❶.
6. Grasp the controller from the front and back and gently pull away from the connectors on the system board ❷.

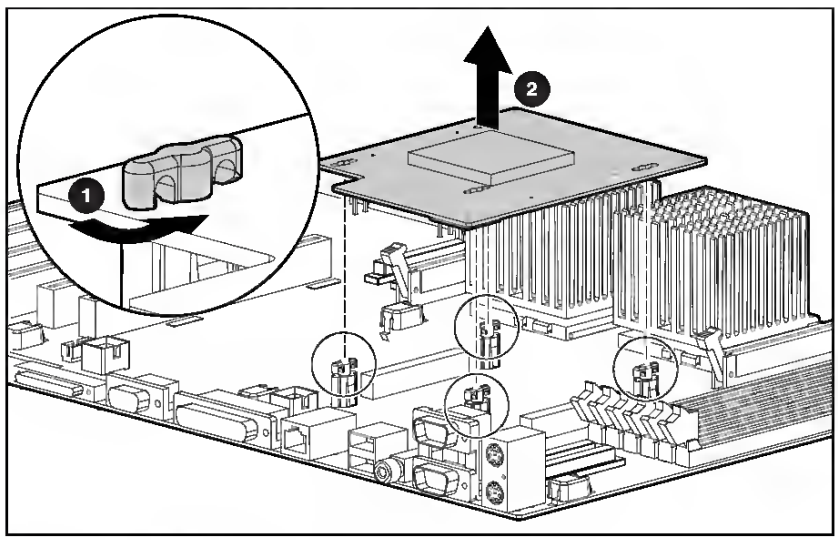

Figure 2-46. Removing the Smart Array 5i Controller

To replace the Smart Array 5i Controller, reverse steps 5 and 6.

System Board

To remove the system board:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the redundant fan cage, if installed. See "Redundant Fan Cage" in the chapter.
5. Remove all expansion boards. See "PCI Hot Plug Expansion Boards" and "Non-Hot-Plug PCI Expansion Boards" in this chapter.
6. Remove the dividers. See "PCI Hot Plug Dividers" in this chapter.
7. Remove the center wall. See "Center Wall" in this chapter.
8. Remove all cable connections.
9. Loosen the two thumbscrews securing the system board to the chassis ❶.
10. Slide the system board toward the front of the chassis to release it from the seven retaining guides ❷.
11. Lift the system board out of the chassis and tilt it to one side to clear the cable guide ❸.

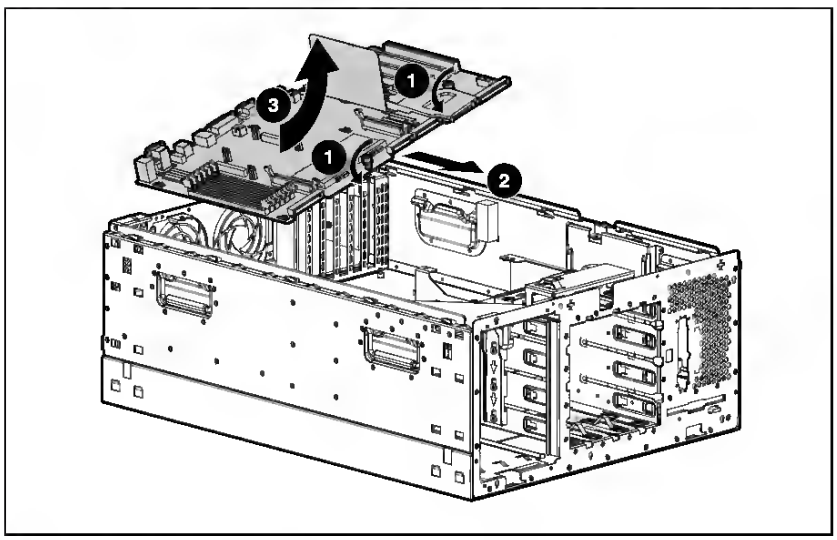

Figure 2-47. Removing the system board

IMPORTANT: For safety and improved serviceability, reinstall the PCI Hot Plug divider base when replacing the system board. See "PCI Hot Plug Divider Base" on the following page for removal and replacement procedures.

To replace the system board, reverse steps 7 through 10 and reinstall all hardware.

NOTE: Ensure that you align the seven retaining guides on the chassis with the holes on the system board when replacing it.

PCI Hot Plug Divider Base

To remove the PCI Hot Plug divider base:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Remove the redundant fan cage, if installed. See "Redundant Fan Cage" in the chapter.
5. Remove all expansion boards. See "PCI Hot Plug Expansion Boards" and "Non-Hot-Plug PCI Expansion Boards" in this chapter.
6. Remove the dividers. See "PCI Hot Plug Dividers" in this chapter.
7. Remove the center wall. See "Center Wall" in this chapter.
8. Remove all cable connections.
9. Remove the system board. See "System Board" in this chapter.
10. Push the two pins that are holding the divider base up from the bottom of the system board ❶.
11. Remove the pins from the system board ❷
12. Remove the PCI Hot Plug divider base from the system board ❸

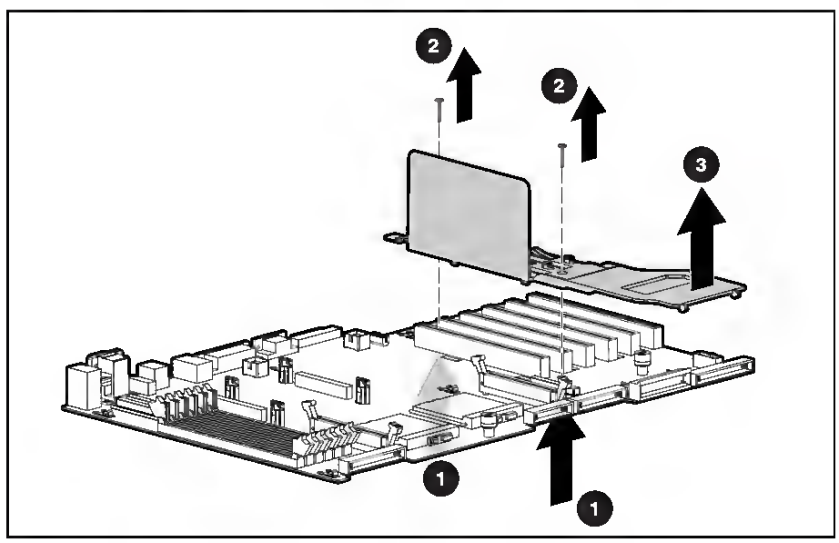

Figure 2-48. Removing the PCI Hot Plug divider base

To replace the PCI Hot Plug divider base, reverse steps 10 through 12.

Battery

When your server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is usually about 5 to 10 years. Use a Compaq 540-milliampere, lithium, 3-volt replacement battery (P/N 179322-xx1).

WARNING: To remove all power from the server, unplug the power cord from either the electrical outlet or the server or other product. If there is more than one power cord, all cords must be unplugged before all power is removed from the server.

WARNING: This server contains an internal lithium manganese dioxide or vanadium pentoxide battery. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the Compaq spare designated for this server.

CAUTION: Do not dispose batteries, battery packs, and accumulators with general household waste. Use the public collection system, or return them to your authorized partners or their agents for recycling.

CAUTION: Loss of BIDS settings occurs when the battery is removed. BIDS settings must be reconfigured whenever the battery is replaced.

To remove the battery:

1. Power down the server. See "Powering Down the Server" in this chapter.
2. Unlock the front bezel (tower server only).
3. Remove the access panel. See "Access Panel" in this chapter.
4. Locate the battery.

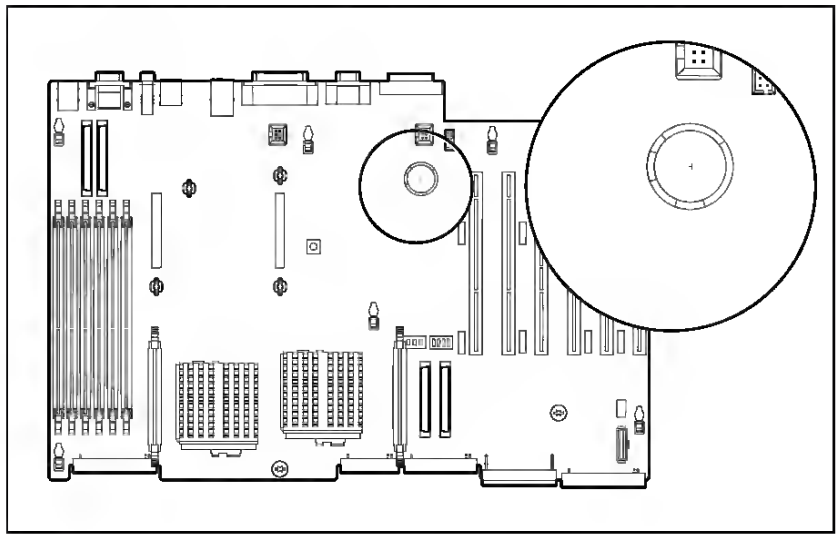

Figure 2-49. Battery

5. Remove the battery from the system board.

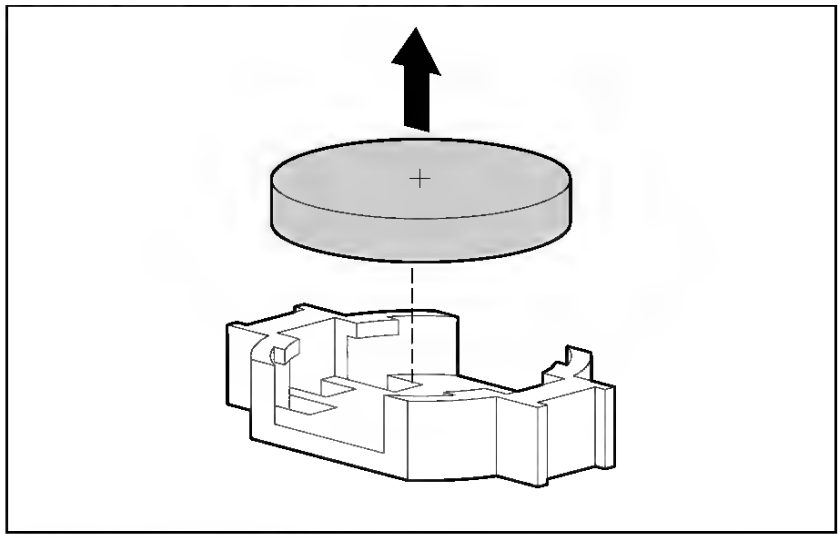

Figure 2-50. Removing the battery

6. Run RBSU to configure the system after replacing the battery. Refer to troubleshooting information in the server setup and installation guide for more information.

To replace the battery, reverse step 5.

Chapter **3**

Diagnostic Tools

This chapter is an overview of software and firmware diagnostic tools that are available for configuring, monitoring, and managing ProLiant ML370 Generation 2 servers.

Diagnostic Tools Overview

Use the following tools to diagnose problems, test hardware, and monitor and manage Compaq ProLiant ML370 Generation 2 server operations.

Table 3-1
Diagnostic Tools

Tool	Description	How to run the tool
Array Diagnostics Utility (ADU)	ADU is a Microsoft Windows operating system-based tool designed to run on all Compaq systems that support Compaq array controllers. ADU collects information about the array controllers in the system and generates a list of detected problems.	For a list of Compaq servers that support ADU, visit the Compaq website: www.compaq.com For a complete list of ADU error messages, refer to the *Compaq Servers Troubleshooting Guide.*
Automatic Server Recovery (ASR-2)	ASR-2 automatically restarts the server after a catastrophic operating system failure. With ASR-2, you have multiple recovery options: ■ Available Recovery provides software error recovery and environmental recovery. ■ Unattended Recovery logs the error information to the IML, resets the server, and tries to restart the operating system.	Run RBSU and set ASR-2 to enable this tool.
Compaq Diagnostics	Compaq Diagnostics tests and verifies operation of Compaq hardware. If Compaq Diagnostics finds a hardware failure, it isolates the replaceable part, if possible.	Access Compaq Diagnostics when POST detects a system configuration error. For a complete list of POST error messages, refer to the *Compaq Servers Troubleshooting Guide.*
Compaq Insight Manager™ XE	Compaq Insight Manager XE is a client/server application used to remotely manage Compaq hardware in a network environment. The Compaq Insight Manager application reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information on viewing and printing the event list, refer to the Compaq Management CD, the *Compaq Insight Manager User Guide,* or the "Server Configuration and Utilities" chapter in the *Compaq ProLiant ML370 Generation 2 Server Setup and Installation Guide.*

continued

Table 3-1
Diagnostic Tools *continued*

Tool	Description	How to run the tool
Compaq SmartStart for Servers Software	Compaq SmartStart software is the intelligent way to set up your Compaq server. The Compaq SmartStart for Servers CD includes the *ROMPaq*™ Utility, driver updates, and assistance installing operating systems.	Use the information provided in the Server Setup and Management pack.
Compaq Survey Utility	Compaq Survey Utility gathers critical hardware and software information on servers running Microsoft Windows NT or Novell NetWare If a significant change occurs between data-gathering intervals, the Compaq Survey Utility marks the previous information and overwrites the survey text files to reflect the latest changes in the configuration	Install the Compaq Survey Utility from the SmartStart CD, the Compaq Integration Maintenance Utility, or the Compaq Management CD.
Integrated Management Log (IML)	The IML is a log of system events such as system failures or nonfatal error conditions View events in the IML from within: ■ Compaq Insight Manager XE ■ Compaq Survey Utility ■ Operating system-specific IML utilities	The IML requires Compaq operating system-dependent drivers. Refer to the SmartStart CD for instructions on installing the appropriate drivers.
ROM-Based Setup Utility (RBSU)	RBSU configures the hardware installed in or connected to the server. Specifically, it can: ■ Configure ports and IRQ, if required. ■ Manage memory installation, processor upgrades, and mass storage devices. ■ Store configuration information in nonvolatile memory. ■ Assist in installing an operating system.	Run RBSU by pressing the **F9** key during POST.

continued

Table 3-1
Diagnostic Tools *continued*

Tool	Description	How to run the tool
ROMPaq Utility	The ROMPaq Utility checks the system and provides a choice of available ROM revisions and controller firmware.	Run this utility from the SmartStart CD included with your server.
SmartStart Diskette Builder	The SmartStart Diskette Builder is a utility that uses data stored on the SmartStart CD to create support diskettes. You can create support diskettes for specific configuration needs or for software that cannot be used directly from the SmartStart CD.	Run the diskette builder tool from the SmartStart CD.

Chapter 4

LED Indicators and Switches

This chapter provides information about locating and using system LEDs and switches in your Compaq ProLiant ML370 Generation 2 server. For additional information about troubleshooting procedures, refer to Appendix D, "Troubleshooting," in the setup and installation guide.

System LEDs

Compaq ProLiant ML370 Generation 2 servers contain several sets of LEDs that indicate the status and settings of hardware components. This chapter discusses the following types and locations of LEDs:

- Front panel
- Hot-plug SCSI bard drive
- PCI Hot Plug
- RJ-45 connector
- Rear unit identification LED switch
- Hot-plug power supply
- Hot-plug fan
- System board

Information at the end of this section discusses the interactions between external and system board LEDs in troubleshooting or assessing system status.

Front Panel LEDs

The set of five LEDs on the front of the server indicates system health. The following figure and table identify and describe the location and function of each of the LEDs.

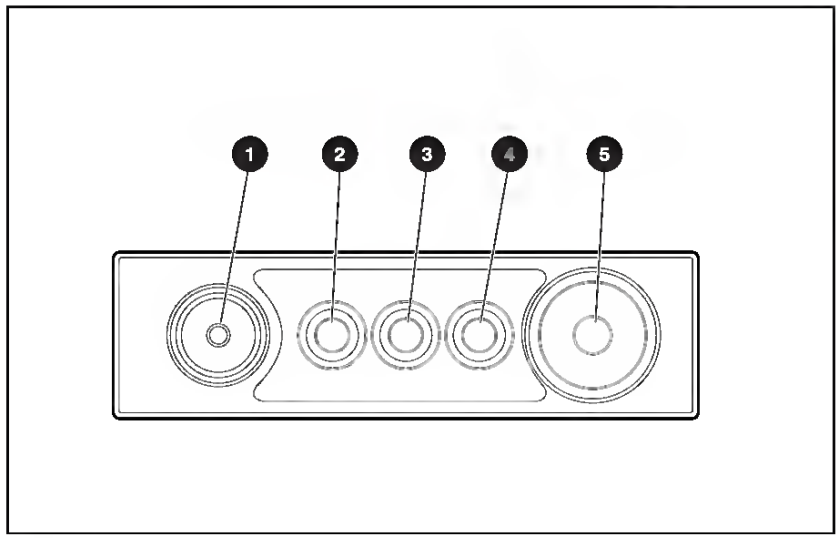

Figure 4-1. Front panel LEDs

Table 4-1
Front Panel LEDs

Item	Description	Status
❶	UID switch and LED	Blue = System activated Blue flashing = System being managed remotely Off = System deactivated
❷	Internal health LED	Green = Normal (system on) Amber = System degraded Red = System critical Off = Normal (system off)
❸	External health (power supply) LED	Green = Normal (system on) Amber = Redundant power supply failed Red = Critical power supply failed Off = Normal (system off)
❹	Network LED (embedded NIC only)	Green = Network link Blinking = Network link/activity Off = No network connection
❺	Power On/Standby button and LED	Amber = Power off (auxiliary power only) Green = Power on Off = Power cord not attached to the server or the power supply failed

The internal health LED identifies service events for internal components in a pre-failure or failed condition. Internal components include fans, processors, PPMs, memory, and overtemperature conditions. For a list of these events, refer to Appendix D, "Troubleshooting," in the setup and installation guide.

Hot-Plug SCSI Hard Drive LEDs

Each hot-plug SCSI hard drive has three LEDs located on the front of the drive. They provide activity, online, and fault status for each corresponding drive when configured as a part of an array and attached to an active Smart Array Controller. LED behaviors may vary, depending on the status of other drives in the array. Use the following figure and tables to identify LED locations and analyze the status of each hot-plug SCSI hard drive.

WARNING: Read the "Hot-Plug Hard Drive Replacement Guidelines" in the *Compaq Servers Troubleshooting Guide* before removing a hard drive.

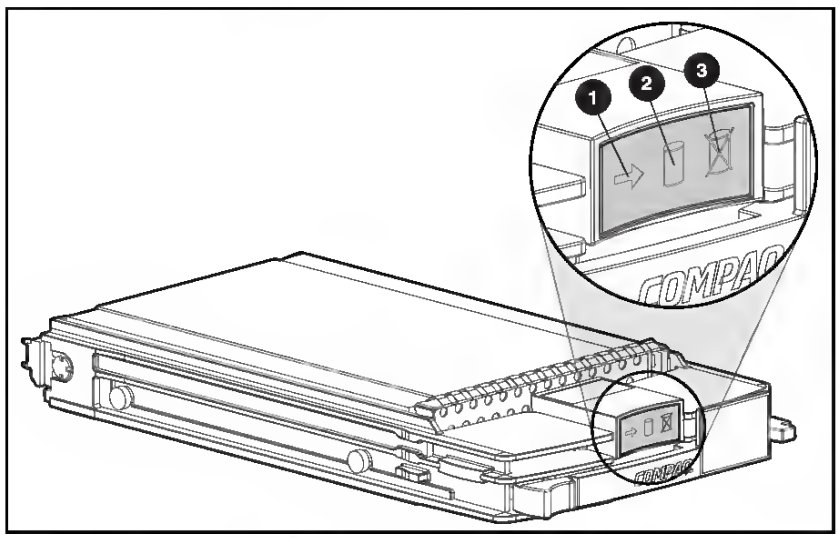

Figure 4-2. Hot-plug SCSI hard drive LEDs

Table 4-2
Hot-Plug SCSI Hard Drive LEDs

Item	Description	Status
❶	Drive activity	On = Drive activity
		Off = No drive activity
❷	Online status	Flashing = Online activity
		Off = No online activity
❸	Fault status	Flashing = Fault-process activity
		Off = No fault-process activity

Table 4-3
Hot-Plug SCSI Hard Drive LED Combinations

Activity LED	Online LED	Fault LED	Status
On	Off	Off	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is being accessed and is not configured as part of an array.
On	Flashing	Off	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is rebuilding or undergoing capacity expansion.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is part of an array being selected by the Array Configuration Utility. -Or- The Options ROMPaq is upgrading the drive.
Off	Off	Off	OK to replace the drive online if a predictive failure alert is received and the drive is attached to an array controller. The drive is not configured as part of an array. -Or- If this drive is part of an array, a powered-on controller is not accessing the drive. -Or- The drive is configured as an online spare.
Off	Off	On	OK to replace the drive online. The drive has failed and has been placed offline.
Off	On	Off	OK to replace the drive online if a predictive failure alert is received (see the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
On or flashing	On	Off	OK to replace the drive online if a predictive failure alert is received (see the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and being accessed.

PCI Hot Plug LEDs

The PCI Hot Plug LEDs adjacent to each PCI Hot Plug expansion slot provide a visual reference of the status for each slot. These LEDs are viewable from the rear of the server or from within the server after you remove the access panel.

To execute a PCI Hot Plug operation, you can power down a PCI Hot Plug expansion slot with software or with the PCI Hot Plug button. LEDs provide visual verification that the slot is powered down.

Use the following figure and table to determine the location and function of each LED.

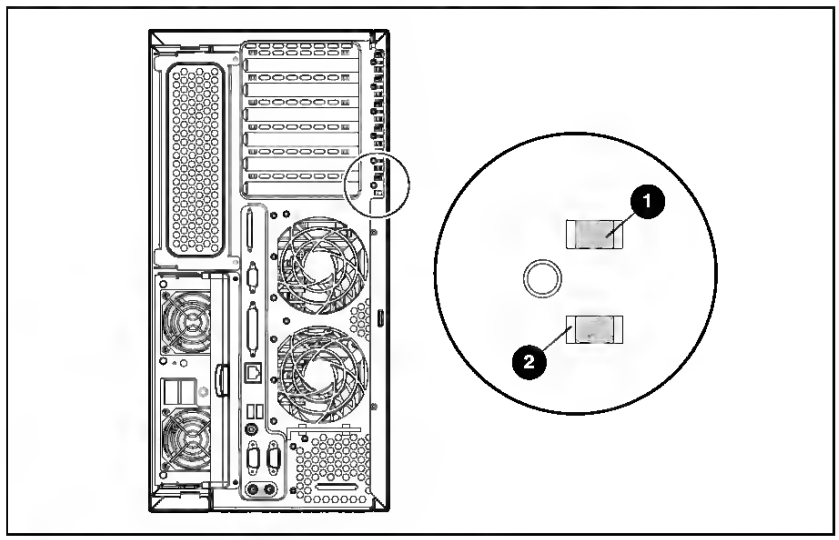

Figure 4-3. PCI Hot Plug expansion slot LEDs

Table 4-4
PCI Hot Plug Expansion Slot LEDs

Item	Description	Status
❶	Slot power (green)	On = Power is applied to the slot. Blinking = Power is cycling. Off = Power is not applied to the slot.
❷	Slot fault (amber)	On = Board has failed. Off = Board is normal.

RJ-45 Connector LEDs

The RJ-45 connector on the server rear panel has two LEDs. Use the following figure and table to identify the LED locations and status.

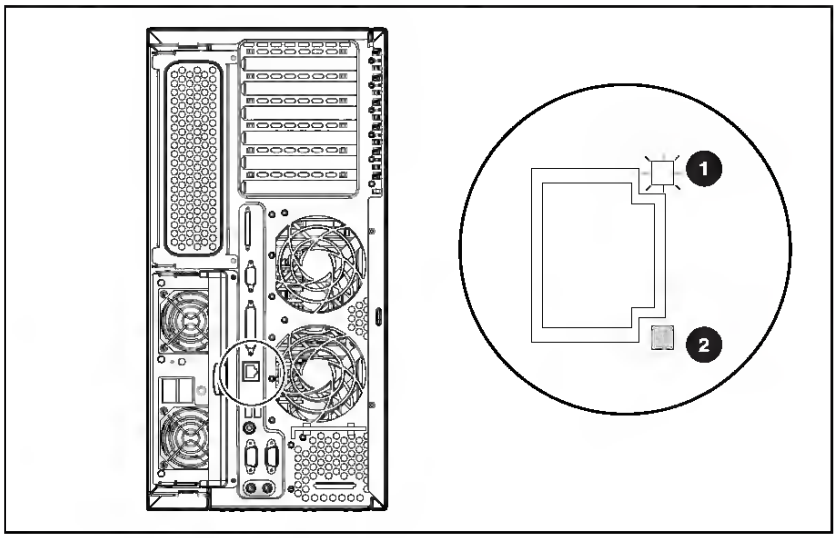

Figure 4-4. RJ-45 connector LEDs

Table 4-5
RJ-45 Connector LEDs

Item	Description	Status
❶	Activity	On or flashing = Network activity Off = No network activity
❷	Link	On = Linked to network Off = No network link

Rear Unit Identification LED Switch

Compaq ProLiant ML370 Generation 2 servers include unit identification LEDs with switches (UID) on both the front and rear panels. The UIDs indicate activity status and can be toggled on and off by the front or rear hardware push button or by the Compaq Insight Manager XE application.

The rear UID provides a visual reference for locating an individual server in a rack of servers. It also contains an integrated button to activate or deactivate the LED.

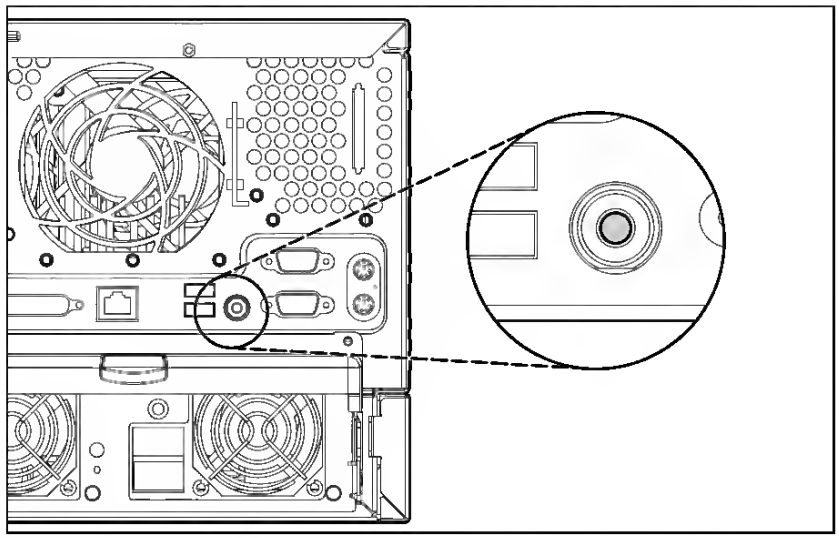

Figure 4-5. Rear UID and switch (rack model)

The rear UID indicates the following states:

- Blue on = The switch is activated.
- Blue flashing = The system is being monitored remotely.
- Off = The switch is deactivated.

Hot-Plug Power Supply LEDs

Determine the hot-plug power supply status by noting the color of the power supply LED located adjacent to the AC inlet.

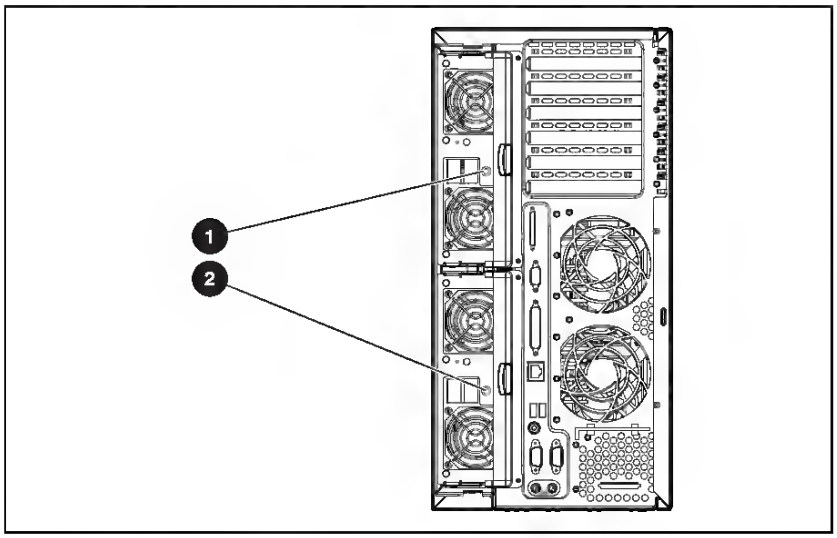

Figure 4-6. Hot-plug power supply LEDs

Table 4-6
Hot-Plug Power Supply LEDs

Item	Description
❶	Secondary (redundant) power supply
❷	Primary power supply

When the power supply LED is off, the following conditions may exist:

- No AC power is available.
- The power supply has failed.
- The power supply is in standby mode.
- The power supply has exceeded current limit.

When the power supply LED is green, the power is turned on and the power supply is functioning properly.

Hot-Plug Fan LEDs

Each hot-plug fan contains a dual-color LED.

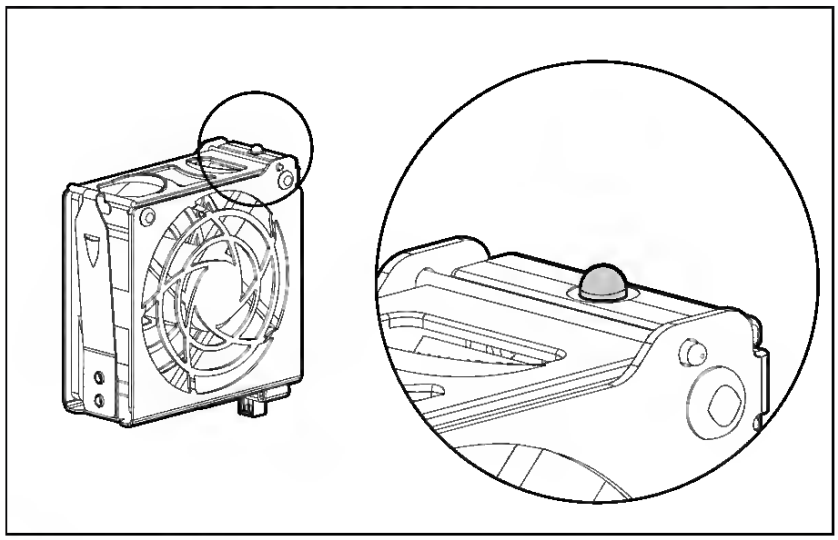

Figure 4-7. Hot-plug fan LED

The hot-plug fan LED indicates the following conditions:

- Green = The fan is operating normally.
- Amber = The fan has failed.
- Off = The fan is not powered or is not seated.

System Board LEDs

The following LEDs are located on the system board:

- Processor status
- PPM status
- Memory status
- System overtemperature

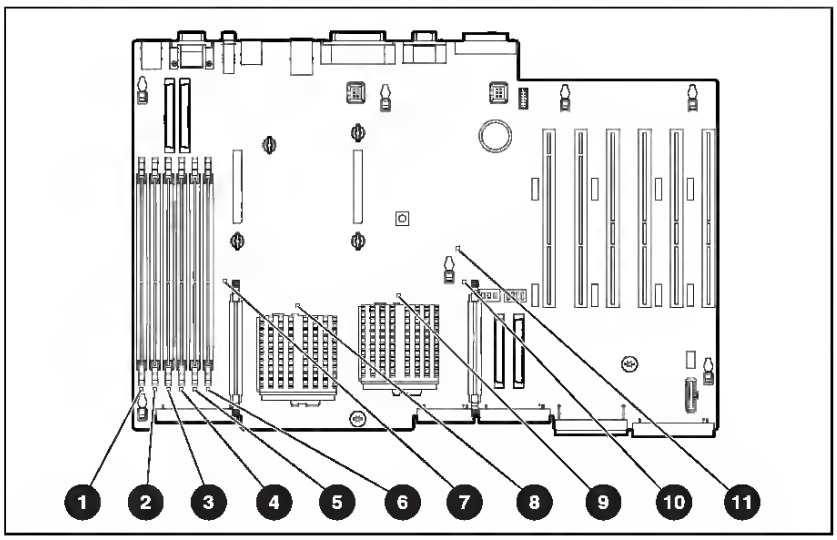

Figure 4-8. System board LEDs

Table 4-7
System Board LEDs

Item	Description	Status
1	Memory status 6C	Amber = Memory failed Off = Normal
2	Memory status 5B	
3	Memory status 4A	
4	Memory status 3C	
5	Memory status 2B	
6	Memory status 1A	
7	PPM 1	Amber = Processor or PPM failed Off = Normal
8	Processor 1	
9	Processor 2	
10	PPM 2	
11	System overtemperature	Amber = System overtemperature event Off = Normal

System LEDs and Internal Health LED Status Combinations

When the internal health LED on the front panel illuminates either amber or red, the server is experiencing a health event. The combinations of illuminated system LEDs and the internal health LED in the following table indicate system status.

NOTE: The system management driver must be installed in order for the internal health LED to provide pre-failure and system conditions.

The internal health LEDs on the front panel indicate the current hardware status and are used to assist in initial troubleshooting. Note that in some situations, Compaq Insight Manager XE application reports server status differently than the health LEDs because it tracks more system attributes.

Table 4-8
System LEDs and Internal Health LED Status Combinations

System LED and Color	Internal Health LED Color	Status
Processor failure, socket *X* (amber)	Red	■ Processor in socket *X* has failed. ■ Processor has failed over to offline spare. ■ Processor is not installed in socket *X*. ■ ROM detects a failed processor during POST.
	Amber	Processor in socket *X* is in pre-failure condition.
Processor failure, both sockets (amber)	Red	Processor types do not match.
PPM failure, slot *X* (amber)	Red	■ PPM in slot *X* has failed. ■ PPM *X* is not installed. ■ PPM is not installed, but the corresponding processor is installed.
DIMM failure, slots *X* (amber)	Red	■ DIMM in slot *X* has failed. ■ DIMM has experienced a multi-bit error.
	Amber	■ DIMM has reached single-bit correctable error threshold. ■ DIMM in slot *X* is in pre-failure condition.
DIMM failure, all slots in one bank (amber)	Red	Interleaving error. The bank is not populated entirely or DIMMs do not all match within the bank.
DIMM failure, all slots (amber)	Red	No valid or usable memory is installed in the system.
	Green	Normal

continued

Table 4-8
System LEDs and Internal Health LED Status Combinations *continued*

System LED and Color	Internal Health LED Color	Status
System overtemperature (amber)	Red	System has exceeded OS cautionary level or critical hardware level.
	Green	Normal
Fan (amber)	Red	A required fan has failed.
	Amber	A redundant fan has failed.
Power supply (off)	Red	Primary power supply or both power supplies have failed.
	Amber	Secondary power supply has failed.

System Board Switches

Some server operations, including adding or removing a component, changing a security feature, or reconfiguring the server from tower to rack, require that you reconfigure a system switch. If the system configuration is incorrect, your computer may not work properly and you may receive error messages on the screen.

This section discusses the following system board switches:

- Non-maskable interrupt
- System identification
- System maintenance

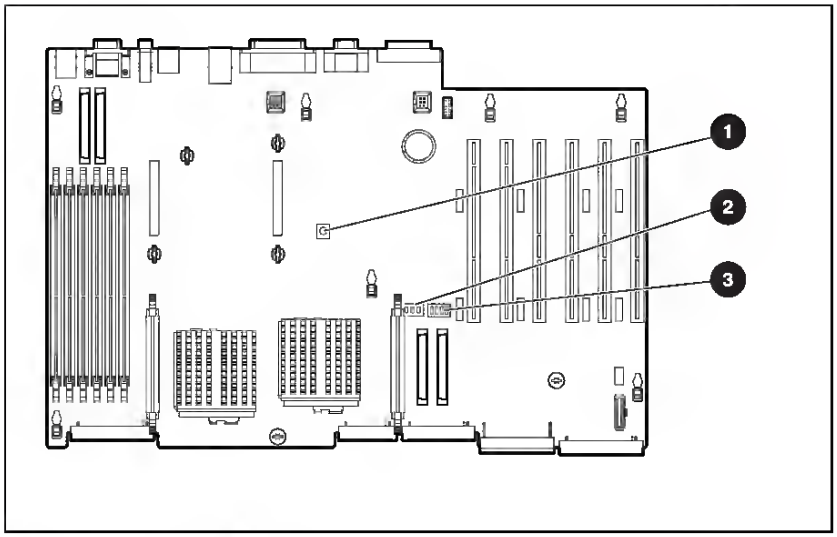

Figure 4-9. System board switches

Table 4-9
System Board Switches

Item	Switch Type
❶	Non-maskable interrupt switch (SW4)
❷	System identification switch (SW2)
❸	System maintenance switch (SW1)

Non-Maskable Interrupt Switch

Crash dump analysis is an essential part of eliminating reliability problems such as hangs or crashes in operating systems, device drivers, and applications. Many crashes freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

Systems running Microsoft Windows NT experience a blue screen trap when the operating system crashes. When this happens, Microsoft recommends that system administrators perform a non-maskable interrupt (NMI) event by pressing a dump switch. The NMI event allows a hung system to once again become responsive.

System Identification Switch

The system identification switch (SW2) is a three-position switch that identifies the operational configuration of the server. This switch is set to the correct configuration for your server by default. The following table shows the switch settings and positions.

CAUTION: Do not alter the default setting for your server. Doing so causes improper server operation.

Table 4-10
System Identification Switch (SW2)

Position	Description	On/Off Function
1	ID0	Off
2	ID1	Off
3	ID2	Off

The NMI switch, or SW4, is used ONLY in the event of a service emergency that requires a complete data dump in preparation for recovering the system from a blue screen or other catastrophic event.

System Maintenance Switch

The system maintenance switch (SW1) is a six-position switch that is used for system configuration. The default setting for all six positions is off. For the proper system maintenance switch settings, refer to the labels attached to the inside of the server access panel or see the following table.

Table 4-11
System Maintenance Switch (SW1)

Position	Description	On/Off Function
1	RESERVED	—
2	Configuration lock	Off = System configuration can be changed. On = System configuration is locked and cannot be modified
3	Rack mount indicator	Off = System is in a tower configuration. On = System is in a rack-mounted configuration
4	Enable diskette boot	Off = Booting from diskette is controlled by RBSU On = Booting from diskette is enabled and RBSU setting is overridden.
5	Password disable	Off = Power-on password works normally. On = Power-on password is disabled.
6	Invalidate configuration	Off = No function is available. On = ROM treats system configuration as invalid.

System Configuration Settings

It may be necessary at some time to clear and reset system configuration settings. When the system maintenance switch position 6 is set to the on position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM. For additional information about locating the switch and switch settings, see "System Maintenance Switch" in this chapter. The default setting for all positions is off.

IMPORTANT: Clearing CMOS and/or (NVRAM) deletes your configuration information. Refer to Chapter 9, "Server Configuration and Utilities," in the setup and installation guide for complete instructions on configuring your server.

To erase all system configuration settings:

1. Power down the server.
2. Remove the access panel.
3. Set the position 6 lever to the on position.
4. Power up the server.

   All configuration settings are now erased and all system operations halt.
5. Power down the server.
6. Reset tbe position 6 lever to thc default off position.
7. Power up the server.
8. Press the **F9** key to run RBSU and reset all system configuration settings.

NOTE: For instructions on using RBSU to reset system configuration settings, refer to Chapter 9, "Server Configuration and Utilities," in the setup and installation guide.

ROMPaq Disaster Recovery Mode

A corrupted system ROM requires that you recreate the ROM BIOS by a process called flashing thc ROM. This operation can be accomplished only when thc system is in disaster recovery (emergency repair boot) mode. If both sides of the redundant ROM are corrupted, the system automatically enters the disaster recovery mode. The server emits three extended beeps.

To perform ROMPaq disaster recovery:

1. After hearing the three beeps, insert a ROMPaq diskette with the latest system ROM from SmartStart.

   IMPORTANT: The ROMPaq flashes both sides of the redundant ROM, and this process may take up to 10 minutes.
2. Wait until the server emits three rising beeps, indicating the completion of the ROM flash process.
3. Cycle the system power.

Chapter 5

Specifications

This chapter provides operating and performance specifications for the Compaq ProLiant ML370 Generation 2 servers and optional hardware, including:

- Tower server
- Rack server
- Memory modules
- 1.44-MB diskette drive
- IDE CD-ROM drive
- Wide Ultra3 hot-plug SCSI hard drive

Tower Server

Table 5-1
Tower Server Specifications

Feature	Metric Units	English Units
Dimensions		
Height		
Without feet	44.45 cm	17.50 in
With feet	46.89 cm	18.46 in
Depth		
Without bezel	63.50 cm	25.00 in
With bezel	71.12 cm	28.00 in
Width	22.07 cm	8.69 in
Weight (no drives installed)	23 05 kg	50.80 lb
Power supply input		
Rated input voltage		90 to 264 VAC
Rated input frequency		47 to 63 Hz
Rated input current		7.3 A (110 V) / 3.6 A (220 V)
Rated input power		800 W
BTUs per hour		2732
Power supply output		
Rated steady-state power		500 W
Maximum peak power		550 W for up to 2 minutes
Rated output voltages		+5, +3.3, +12, -12 (VDC)
Rated auxiliary voltage		+5 VDC
Temperature range		
Operating	5° to 35°C	41° to 95°F
Shipping	-40° to 85°C	-40° to 185°F
Relative humidity (noncondensing)		
Operating	5% to 95%	5% to 95%
Non-operating	5% to 95%	5% to 95%
Maximum wet bulb temperature	38.7°C	101.7°F

Rack Server

Table 5-2
Rack Server Specifications

Feature	Metric Units	English Units
Dimensions		
Height	22.07 cm	8.69 in
Depth	65.41 cm	25.75 in
Width	48.26 cm	19.0 in
Weight		
No drives installed	23.05 kg	50.8 lb
Power supply input		
Rated input voltage		90 to 264 VAC
Rated input frequency		47 to 63 Hz
Rated input current		7.3 A (110 V) / 3.6 A (220 V)
Rated input power		800 W
BTUs per hour		2732
Power supply output		
Rated steady-state power		500 W
Maximum peak power		550 W for up to two minutes
Rated output voltages		+5., +3.3, +12., -12 (VDC)
Rated auxiliary voltage		+5 VDC
Temperature range		
Operating	5° to 35°C	41° to 95°F
Shipping	-40° to 50°C	-40° to 185°F
Relative humidity (noncondensing)		
Operating	5% to 95%	5% to 95%
Non-operating	5% to 95%	5% to 95%
Maximum wet bulb temperature	38.7°C	101.7°F

Memory Modules

Table 5-3
Memory Module Specifications

Feature	Description
DIMM sizes	128-, 256-, 512-MB, or 1-GB DIMM
DIMM speed	133 MHz
Maximum memory	6 GB maximum (4 GB with online spare support)
Type Configuration	Registered SDRAM DIMM (2 × 1 interleaving)

1.44-MB Diskette Drive

Table 5-4
1.44-MB Diskette Drive Specifications

Feature	Description
Size	3.5 inch
LEDs (front panel)	Green = Dn
Read/write capacity per diskette	
High density	1.44 MB
Low density	720 KB
Drives supported	1
Drive height	Dne-third height
Drive rotation	300 rpm
Transfer rate	
High	500 Kb/s
Low	250 Kb/s
Bytes/sector	512
Sectors per track (high/low)	18/9
Tracks per side (high/low)	80/80
Access times	
Track-to-track (high/low)	3 ms/6 ms
Average (high/low)	169 ms/94 ms
Settling time	15 ms
Latency average	100 ms
Cylinders (high/low)	80/80
Read/write heads	2

CD-ROM Drive

Table 5-5
CD-ROM Drive Specifications

Feature	Description
Applicable disk	CD-ROM (modes 1 and 2); mixed mode (audio and data combined), CD-DA, Photo CD (single/multiple-session), CD-XA ready; CDi ready
Capacity	540 MB (mode 1, 12 cm)
	650 MB (mode 2, 12 cm)
Block size	2048 bytes (mode 1)
	2336 bytes (mode 2)
	2352 bytes (CD-DA)
	2328 bytes (CD-XA)
Dimensions	
Height	42.9 mm (1.68 in)
Depth	150.1 mm (5.85 in)
Width	208.0 mm (8.11 in)
Weight	0.950 kg (2.09 lb)
Data transfer rate	
Sustained	150 KB/s (sustained 1X), 1500-4800 KB/s (10X to 32X)
Burst	4.0 MB/s
Access times (typical)	
Full stroke	350 ms
Random	150 ms
Diameter	12 cm, 8 cm (4.70 in, 3.15 in)
Thickness	1.2 mm (0.05 in)
Track pitch	1.6 µm (6.3×10^{-7} in)
Cache/buffer	128 KB
Startup time	< 7 s
Stop time	< 4 s (single), < 30 s (multisession)
Laser parameters	
Type	Semiconductor laser GaAs
Wave length	700 ± 25 nm
Divergence angle	53.5° ± 1.5°
Output power	0.14 mW

continued

Table 5-5
CD-ROM Drive Specifications *continued*

Feature	Description
Operating conditions	
Temperature	5° to 45°C (41° to 118°F)
Humidity	5% to 90%

Wide Ultra3 Hot-Plug SCSI Hard Drive

Table 5-6
Wide Ultra3 Hot-Plug SCSI Hard Drive Specifications

Feature	36-GB 10K RPM	72-GB 10K RPM	9-GB 15K RPM	18-GB 15K RPM
Capacity	36419.6 MB	72839.2 MB	9100.0 MB	18209.8 MB
Height	One-third, 1.0 inch	One-third, 1.0 inch	One-third, 1.0 inch	One-third, 1.0 inch
Size	3.5 inch	3 5 inch	3 5 inch	3.5 inch
Interface	Wide Ultra3	Wide Ultra3	Wide Ultra3	Wide Ultra3
Transfer rate	160 MB/sec	160 MB/sec	160 MB/sec	160 MB/sec
Rotational speed	10000 RPM	10000 RPM	15000 RPM	15000 RPM
Physical configuration				
Bytes per sector	512	512	512	512
Logical blocks	71,132,000	142,264,000	17,773524	35,566,080
Operating temperature				
Celsius	10° to 35°C	10° to 35°C	10° to 35°C	10° to 35°C
Fahrenheit	50° to 95°F	50° to 95°F	50° to 95°F	50° to 95°F

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